

Arlington Historic District Commissions

Application for Certificate

(Read attached instructions
before completing form)

For Commission Use Only:

Date Rec: _____

Hearing Date: _____

Certificate #: _____

Monitor: _____

Certificate Requested:

Appropriateness – for work described herein

Minor project Major Project Demolition

Non-Applicability – for the following reason(s):

Not subject to public view

Maintenance, repair, or replacement using same design and materials

Proposed change specifically excluded from review under Bylaw

Other: _____

Hardship – financial or otherwise and does not conflict substantially with
the intent and purposes of the Bylaw

General Information:

Property Address 87 Pleasant St. District _____

Owner(s) Ellenhorn LLC Email _____

Owner's Phone (h) _____ (w) 800 515 9972 (fax) _____

Owner's Address 406 Mass Ave Arlington

Applicant (if not Owner) Don Westwater

Applicant's Phone (h) 781 454 9143 (w) same (fax) _____

Applicant's Address 87 Pleasant St. Arlington

Applicant's Relationship to Owner Staff

Contractor Tesla Phone 877 701 7652

Architect n/a Phone _____

Dates of Anticipated Work: Start early fall Completion early fall

Description of Proposed Work: (attach additional pages as necessary) Please include a description of how the proposed work (if a change or addition) is historically and architecturally compatible with the building and the District as a whole.

remove old roof shingles & replace w/ solar tiles

Required Documentation Acknowledgement: (see attached instructions)

I acknowledge that I am required to provide supporting documentation, including the attached "Supporting Documents Checklist", by the deadlines indicated in the instructions. I understand that if such documents are not provided in a timely manner, this application will be considered to be incomplete and Commission action may be delayed.

I have read the attached instructions and, to the best of my knowledge, the information contained in this application is accurate and complete. I also give permission for members of the AHDC to access the property for the purpose of reviewing this application and work done under any certificate issued to me.

Owners Signature(s): [Signature] Date: 7/16/20

ARLINGTON HISTORIC DISTRICT APPLICATION

Supporting Documentation Checklist

Property Address 87 Pleasant St. District Pleasant St.
 Applicant's Name Don Westwater Email westwaterdesignbuild@gmail.com
 Applicant's Phone (Day) 781 454 9143 (Mobile) same

☒ **For Minor Projects or Certificate of Non-Applicability**

- ☒ **Drawings (11x17 max., with graphic scale, dimensioned, all materials identified) or marked up Photographs (8x10)**

Existing conditions of historic façade(s) to be modified; Show location of proposed work; Show proposed feature(s); Elevations showing proposed work and context; Drawing showing location of proposed work; Drawing showing the proposed feature(s); Site plan for site located equipment and features

- ☒ **Manufacturer's literature and specifications sheets describing the proposed feature(s)**

- ☒ **Description of how the proposed work is either compatible with the District or Non-Applicable**

☐ **For Major Projects**

- ☐ **Photographs (8x10)**

Existing conditions of historic structure to be modified (facades, roofs, neighboring buildings); Site; Neighborhood context; Historic precedents for proposed work

- ☐ **Drawings (11x17 max., with graphic scale, must show differentiated existing and proposed conditions, dimensions, and all materials identified)**

Plans

Site (showing proposed structures, fences, walls, parking, HVAC equipment, electrical equipment, and relationship to adjacent roads, neighboring buildings); Each floor; Roof (showing valleys, hips, ridges, dormers, skylights, chimneys, vents, HVAC equipment, solar panels)

Elevations of building facades- identify:

Foundation; Siding ; Trim; Gutters; Downspouts; Shutters; Railings; Stairs; Windows; Doors; Roof materials; Roof pitch; Chimneys and vents; Masonry; Light fixtures; Solar panels; HVAC equipment; Electrical equipment; Fences; Signage

Wall sections (especially showing projecting features such as bays, balconies, porches, additions)

Relevant exterior detail drawings (architectural trim, eaves, doors, windows, caps, columns, vents, rail systems)

Profile drawings (window and door elements, railings, balusters, stairs, shutters, roof trim, corner boards, casings, water tables, skirts, frieze boards, and all other trim)

For projections, additions and new construction also include:

Neighborhood lot plan- include footprint to lot area ratio as well as that of neighboring lots; Plot plan- existing building(s), setbacks, proposed new structures; Site section (show relationship to site topography, adjacent structures, major landscape features, roads)

- ☐ **Manufacturers' literature and specification sheets describing the proposed components**

- ☐ **Suggested Supporting Submittals: Model; Physical Samples**

- ☐ **Description of how the proposed work is compatible with the District.**

☐ **For Demolition**

- ☐ **Statement of current state of existing structure and reason for demolition**

- ☐ **Statement of the historic significance of the structure**

- ☐ **Site Documentation (including Plot plan; Photographs of existing conditions; List existing materials; Year built; Original architect)**

- ☐ **Other provided documentation not described above (please list on a separate attached sheet).**

Applicants Signature(s): Don Westwater Date: 7/16/20

Description of How Proposed Work on 87 Pleasant St conforms to AHDC Standards

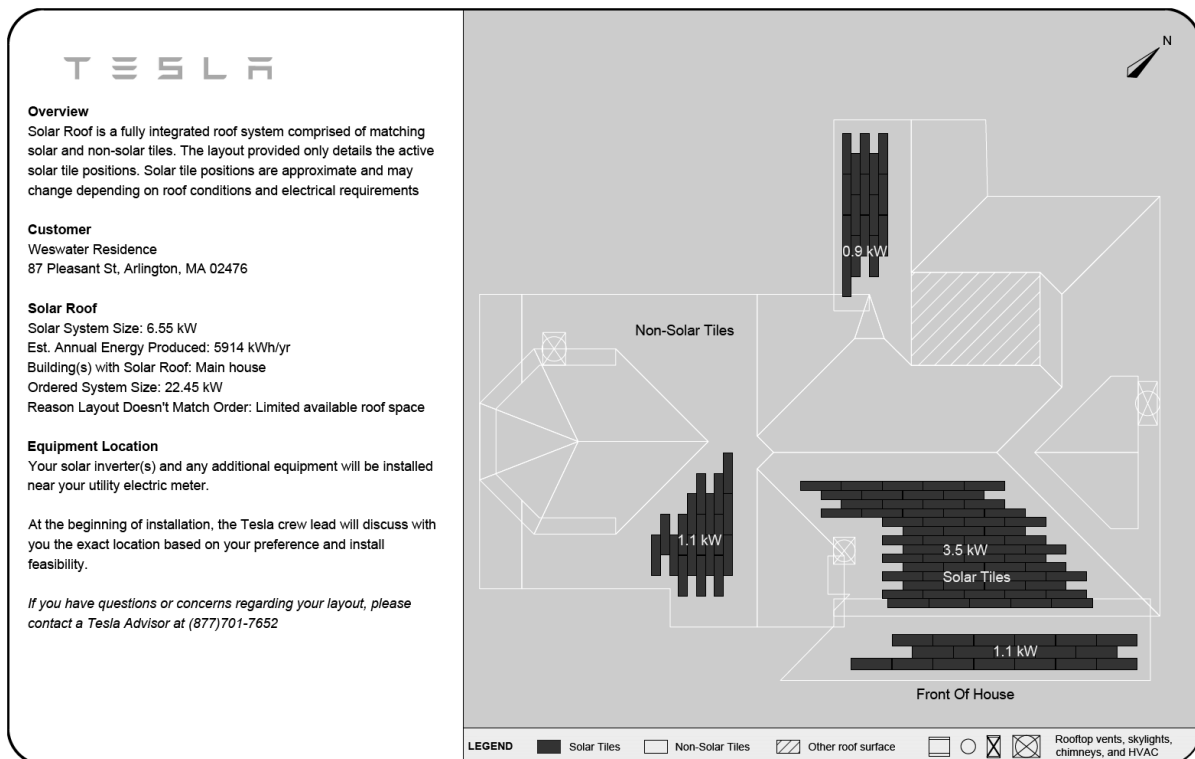
Dear AHDC Board,

The accompanying application and supporting documents requests permission to install black solar tiles on the roof at 87 Pleasant St.

We think that the black roof tiles are consistent with the roofs of the other homes within the Pleasant st. District.

We also hope that the board agrees that the solar roof tiles are preferable to installing a new shingled roof and then mounting solar panels on top of the new roof.

ROOF TILE LAYOUT



4 ABBREVIATIONS

A AMPERE AC ALTERNATING CURRENT BLDG
BUILDING CONC CONCRETE DC DIRECT CURRENT
EGC EQUIPMENT GROUNDING CONDUCTOR (E)
EXISTING EMT ELECTRICAL METALLIC TUBING FSB
FIRE SET-BACK GALV GALVANIZED GEC GROUNDING
ELECTRODE CONDUCTOR GND GROUND HDG HOT
DIPPED GALVANIZED I CURRENT I_{mp} CURRENT AT
MAX POWER I_{sc} SHORT CIRCUIT CURRENT kVA
KILOVOLT AMPERE kW KILOWATT LBW LOAD
BEARING WALL MIN MINIMUM (N) NEW NEUT
NEUTRAL NTS NOT TO SCALE OC ON CENTER PL
PROPERTY LINE POI POINT OF INTERCONNECTION
PV PHOTOVOLTAIC SCH SCHEDULE S STAINLESS
STEEL STC STANDARD TESTING CONDITIONS TYP
TYPICAL UPS UNINTERRUPTIBLE POWER SUPPLY V
VOLT V_{mp} VOLTAGE AT MAX POWER V_{oc} VOLTAGE
AT OPEN CIRCUIT W WATT 3R NEMA 3R, RAIN TIGHT

ELECTRICAL NOTES

1. THIS SYSTEM IS GRID-INTERIED VIA A UL-LISTED POWER-CONDITIONING INVERTER.
2. THIS SYSTEM HAS NO BATTERIES, NO UPS.
3. A NATIONALLY-RECOGNIZED TESTING LABORATORY SHALL LIST ALL EQUIPMENT IN COMPLIANCE WITH ART. 110.3.
4. WHERE ALL TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, A SIGN WILL BE PROVIDED WARNING OF THE HAZARDS PER ART. 690.17.
5. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRED BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART. 210.5.
6. CIRCUITS OVER 250V TO GROUND SHALL COMPLY WITH ART. 250.97, 250.92(B).
7. DC CONDUCTORS EITHER DO NOT ENTER BUILDING OR ARE RUN IN METALLIC RACEWAYS OR ENCLOSURES TO THE FIRST ACCESSIBLE DC DISCONNECTING MEANS PER ART. 690.31(E).
8. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY UL LISTING.

JURISDICTION NOTES

LICENSE

HIC #168572
ELEC 22812A

AHJ: Arlington

UTILITY: Eversource Energy – South Shore
(NSTAR–Commonwealth Electric)

GENERAL NOTES

1. ALL WORK TO BE DONE TO THE 9TH EDITION OF THE MA STATE BUILDING CODE.
2. ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2020 NATIONAL ELECTRIC CODE INCLUDING MASSACHUSETTS AMENDMENTS.

VICINITY MAP



INDEX

Sheet 1 COVER SHEET
Sheet 2 SITE PLAN
Sheet 3 THREE LINE DIAGRAM
Sheet 4 SITE PLAN PLACARD
Sheet 5 CONDUIT RUN
Cutsheets Attached

| REV BY DATE COMMENTS | | | |
|----------------------|------|------|----------|
| REV A | NAME | DATE | COMMENTS |
| * | * | * | * |
| * | * | * | * |
| * | * | * | * |
| * | * | * | * |

CONFIDENTIAL - THE INFORMATION HEREIN CONTAINED SHALL NOT BE USED FOR THE BENEFIT OF ANYONE EXCEPT TESLA INC., NOR SHALL IT BE DISCLOSED IN WHOLE OR IN PART TO OTHERS OUTSIDE THE RECIPIENT'S ORGANIZATION, EXCEPT IN CONNECTION WITH THE SALE AND USE OF THE RESPECTIVE TESLA EQUIPMENT, WITHOUT THE WRITTEN PERMISSION OF TESLA INC.

JOB NUMBER: JB-0243663 00

MOUNTING SYSTEM:
TESLA SOLAR ROOF

MODULES:
(112) TESLA # SR60T1

INVERTER:
(1) Delta Electronics # M8-TL-US [240V]

CUSTOMER:
Don Westwater
87 Pleasant St
Arlington, MA 02476

7814549143

DESCRIPTION:
6.54864 KW PV ARRAY

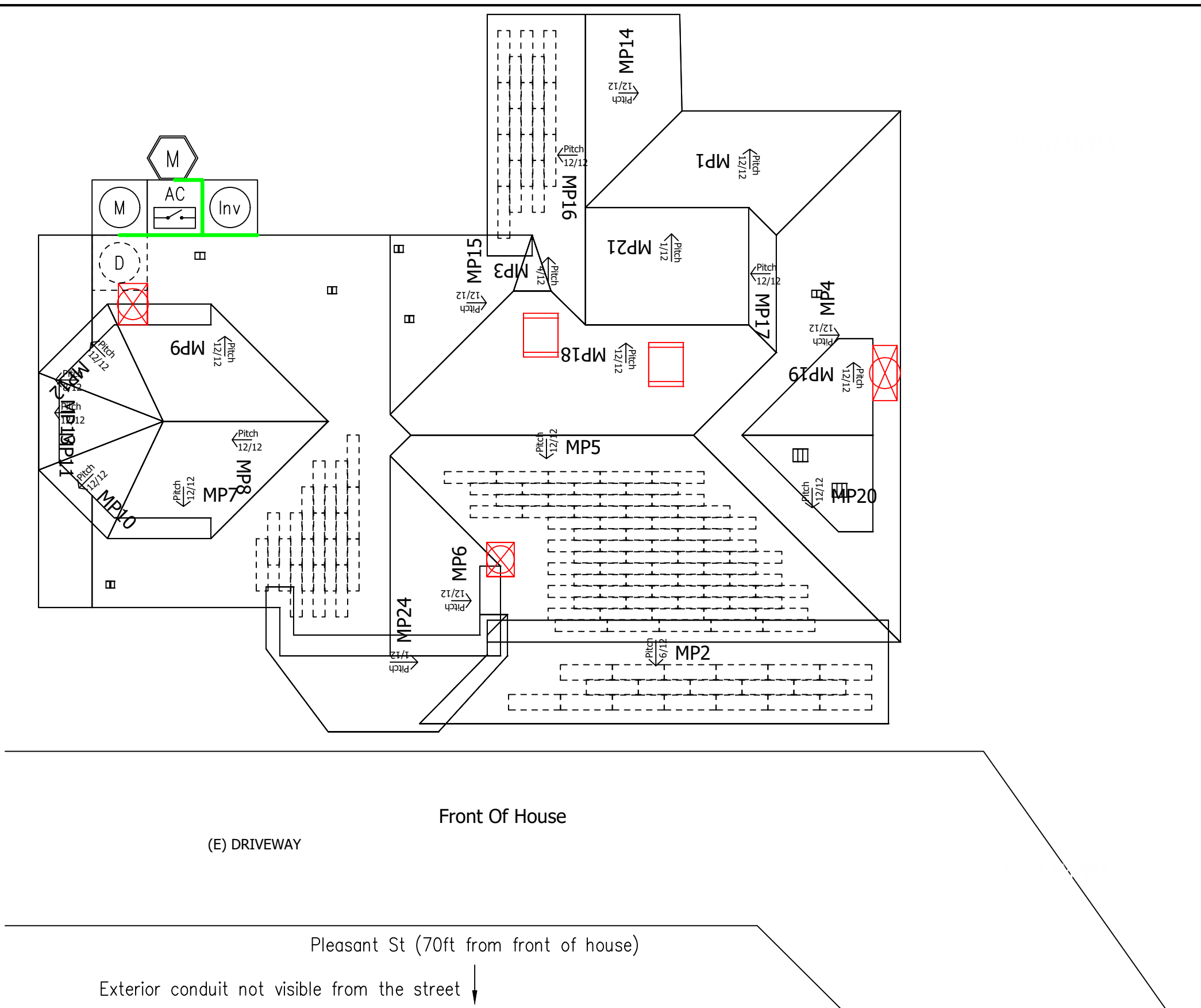
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PAGE NAME:
COVER SHEET

| | |
|---------|----------------|
| DESIGN: | Bobby Sandoval |
|---------|----------------|

SHEET: 1 REV: DATE: 7/12/2020



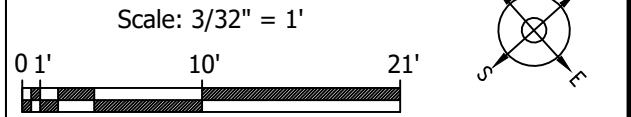


| | | |
|------|---|---|
| MP2 | PITCH: 23 AZIMUTH: 132 MATERIAL: Solar Roof | ARRAY PITCH: 23 ARRAY AZIMUTH: 132 STORY: 1 Story |
| MP5 | PITCH: 45 AZIMUTH: 132 MATERIAL: Solar Roof | ARRAY PITCH: 45 ARRAY AZIMUTH: 132 STORY: 2 Stories |
| MP8 | PITCH: 45 AZIMUTH: 222 MATERIAL: Solar Roof | ARRAY PITCH: 45 ARRAY AZIMUTH: 222 STORY: 2 Stories |
| MP16 | PITCH: 45 AZIMUTH: 222 MATERIAL: Solar Roof | ARRAY PITCH: 45 ARRAY AZIMUTH: 222 STORY: 2 Stories |

LEGEND

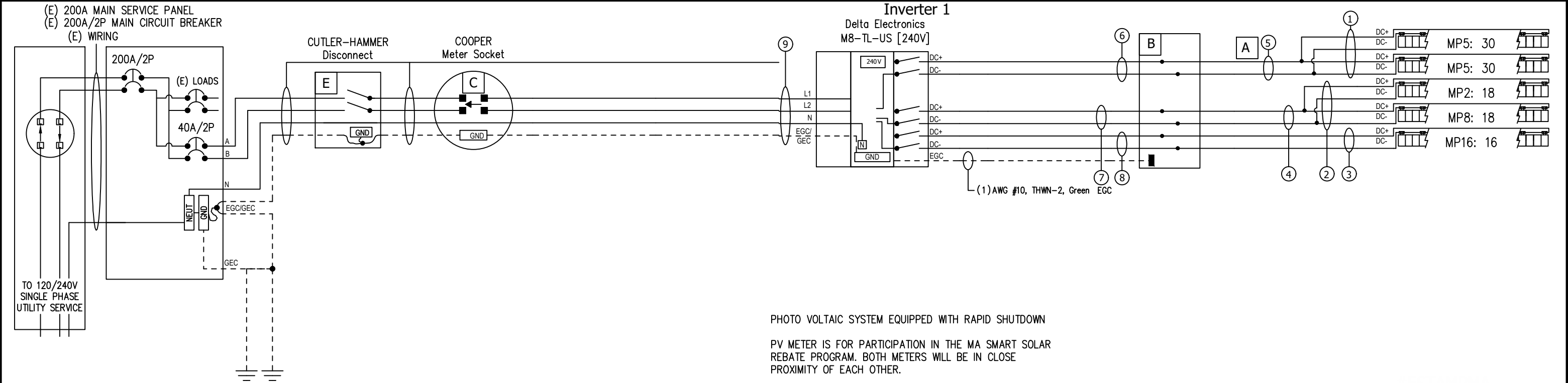
- (E) UTILITY METER & WARNING LABEL
- INVERTER W/ INTEGRATED DC DISCO & WARNING LABELS
- DC DISCONNECT & WARNING LABELS
- AC DISCONNECT & WARNING LABELS
- DC JUNCTION/COMBINER BOX & LABELS
- DISTRIBUTION PANEL & LABELS
- LOAD CENTER & WARNING LABELS
- DEDICATED PV SYSTEM METER
- RAPID SHUTDOWN
- STANDOFF LOCATIONS
- CONDUIT RUN ON EXTERIOR
- CONDUIT RUN ON INTERIOR
- GATE/FENCE
- HEAT PRODUCING VENTS ARE RED
- INTERIOR EQUIPMENT IS DASHED

SITE PLAN



| | | | | | |
|---|--|---|---|--|--|
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| | MOUNTING SYSTEM: TESLA SOLAR ROOF | | | | |
| | MODULES: (112) TESLA # SR60T1 | | | | |
| | INVERTER: (1) Delta Electronics # M8-TL-US [240V] | | | | |

| GROUND SPECS | MAIN PANEL SPECS | GENERAL NOTES | INVERTER SPECS | | MODULE SPECS | LICENSE |
|---|--|----------------------|----------------|---|---|----------------------------|
| BOND (N) #6 GEC TO TWO (N) GROUND RODS AT PANEL WITH IRREVERSIBLE CRIMP | Panel Number: NoLabel Meter Number: 1835659 Underground Service Entrance | Inv 1: DC Ungrounded | INV 1 | — (1) Delta Electronics # M8-TL-US [240V] Inverter; 7680W, 240V/208V, 97.5% Zigbee | — (12) Tesla # SR60T1 Solar Roof PV Module; 58.47W, 52.11W PTC, Textured Voc: 13.34 Vpmax: 10.99 Isc AND Imp ARE SHOWN IN THE DC STRINGS IDENTIFIER | HIC #168572 ELEC 22812A |
| | | | INV 2 | | | |
| | | | INV 3 | | | |



| DC Conduit Reference Chart | | |
|----------------------------|-------------------|--------------------|
| Qty Conductors | Raceway if THWN-2 | Raceway if PV Wire |
| <=(5) AWG #10 | | ¾" EMT or LFMC |
| <=(7) AWG #10 | ¾" EMT or LFMC | 1" EMT or LFMC |
| <=(9) AWG #10 | | 1-¼" EMT or LFMC |

Voc* = MAX VOC AT MIN TEMP

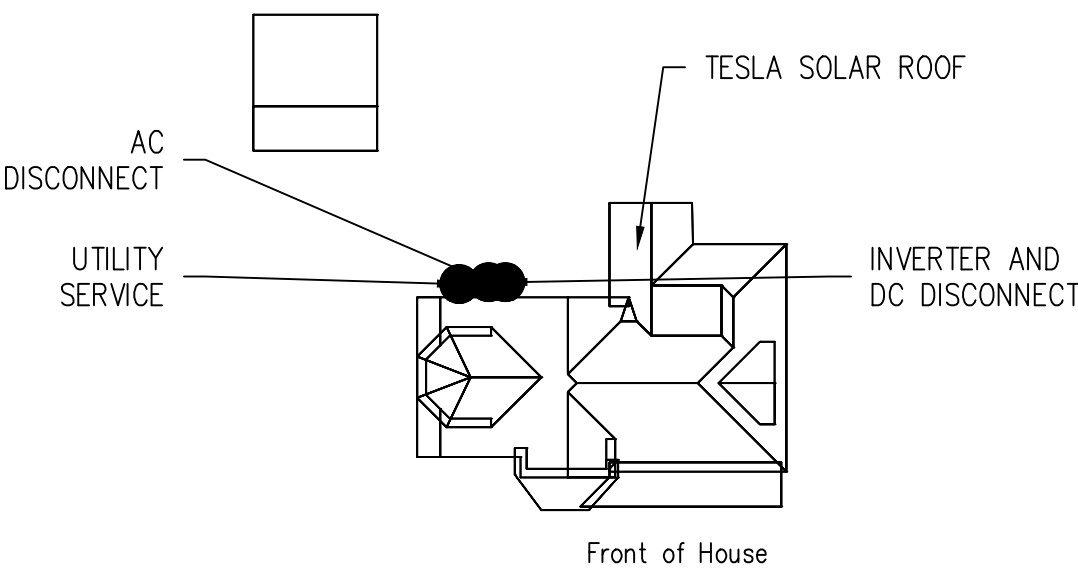
| POI | PV BACKFEED BREAKER | | AC | B | PV | DC |
|---|--|--|---|--|--|--|
| (1)MURRAY # MP240 Breaker; 40A/2P, 2 Spaces — (2)Ground Rod 5/8" x 8", Copper | | | E — (1)CUTLER-HAMMER # DG222URB Disconnect; 60A, 240Vac, Non-Fusible, NEMA 3R — (1)CUTLER-HAMMER # DG100NB Ground/Neutral Kit; 60-100A, General Duty (DG) C — (1)COOPER # B-Line Meter Socket 011 Meter Socket; 125A, 4-14AWG, Ring Type — (1)AW CAP; B-Line Meter Socket Accessory — (1)COOPER # B-LINE 25162 CLEAR PLASTIC METER SOCKET COVER | (4) Junction Box Metal; 6" x 6" x 4" , Box w/ cover; Nema 1 | (9)Delta # GPI00010114 MCI Rapid Shutdown, 600V, 12A, NEMA 4X, MC4, for Solar Roof | |
| 9 — (1)AWG #8, THWN-2, Black — (1)AWG #8, THWN-2, Red — (1)AWG #10, THWN-2, White — (1)AWG #8, THWN-2, Green | Vmp = 240 VAC Imp=32 AAC — (1)Conduit Kit; 1" EMT | | 6 — (1)AWG #10, THWN-2, Black — (1)AWG #10, THWN-2, Red 7 — (1)AWG #10, THWN-2, Black — (1)AWG #10, THWN-2, Red 8 — (1)AWG #10, THWN-2, Black — (1)AWG #10, THWN-2, Red | 5 — (2)AWG #10, PV Wire, 600V, Black 4 — (2)AWG #10, PV Wire, 600V, Black | 1 — (4)AWG #10, PV Wire, 600V, Black 2 — (4)AWG #10, PV Wire, 600V, Black 3 — (2)AWG #10, PV Wire, 600V, Black | Voc* = 472.43VDC Isc = 11.3 ADC Vmp = 329.70VDC Imp= 10.64 ADC Voc* = 283.46VDC Isc = 11.3 ADC Vmp = 197.82 VDC Imp= 10.64 ADC Voc* = 251.96 VDC Isc = 5.65 ADC Vmp = 175.84 VDC Imp= 5.32 ADC Voc* = 472.43VDC Isc = 11.3 ADC Vmp = 329.70VDC Imp= 10.64 ADC Voc* = 283.46VDC Isc = 11.3 ADC Vmp = 197.82 VDC Imp= 10.64 ADC Voc* = 251.96 VDC Isc = 5.65 ADC Vmp = 175.84 VDC Imp= 5.32 ADC |

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|---|--|---|--|--|-------|
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| | MOUNTING SYSTEM: TESLA SOLAR ROOF | | | | |
| | MODULES: (112) TESLA # SR60T1 INVERTER: (1) Delta Electronics # M8-TL-US [240V] | | | | |

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF"
POSITION TO SHUT DOWN PV SYSTEM AND REDUCE
SHOCK HAZARD IN ARRAY

Address: 87 Pleasant St



OPERATING VOLTAGE = 240

JB-0243663-00

Note: Used on Delta String Inverters
Yellow background on top, white background on
bottom all black text and images

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*
PAGE NAME:
SITE PLAN PLACARD

DESIGN:
Bobby Sandoval

SHEET: 4 REV: DATE:
7/12/2020





| | | | | | |
|---|--|---|---|--|-------|
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| | MOUNTING SYSTEM: TESLA SOLAR ROOF | | | | |
| | MODULES: (112) TESLA # SR60T1 | | | | |
| | INVERTER: (1) Delta Electronics # M8-TL-US [240V] | | | | |

WARNING: PHOTOVOLTAIC POWER SOURCE

Label Location:
(C)(CB)(JB)
Per Code:
NEC 690.31.G.3

Label Location:
(DC) (INV)
Per Code:
NEC 690.13.B

PHOTOVOLTAIC DC
DISCONNECT

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

Label Location:
(AC)(POI)
Per Code:
NEC 690.13.B

WARNING
ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS
PHOTOVOLTAIC SYSTEM ARE
UNGROUNDDED AND
MAY BE ENERGIZED

Label Location:
(DC) (INV)

MAXIMUM VOLTAGE

MAXIMUM CIRCUIT CURRENT

MAX RATED OUTPUT CURRENT
OF THE CHARGE CONTROLLER
OR DC-TO-DC CONVERTER
(IF INSTALLED)

Label Location:
(DC) (INV)
Per Code:
NEC 690.53

PHOTOVOLTAIC SYSTEM
EQUIPPED WITH RAPID
SHUTDOWN

Label Location:
(INV)
Per Code:
NEC 690.56.C.3

SOLAR PV SYSTEM
EQUIPPED WITH RAPID
SHUTDOWN

TURN RAPID
SHUTDOWN SWITCH
TO THE "OFF"
POSITION TO SHUT
DOWN CONDUCTORS
OUTSIDE THE ARRAY.
CONDUCTORS WITHIN
THE ARRAY REMAIN
ENERGIZED IN SUNLIGHT

Label Location:
ABB/Delta Solivia Inverter
Per Code:
690.56(C)(1)(b)

WARNING
ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED
NORMALLY GROUNDED
CONDUCTORS MAY BE
UNGROUNDDED AND ENERGIZED

Label Location:
(DC) (INV)
Per Code:
690.41.B

WARNING
INVERTER OUTPUT
CONNECTION
DO NOT RELOCATE
THIS OVERCURRENT
DEVICE

Label Location:
(POI)
Per Code:
NEC 705.12.B.2.3.b

SOLAR PV SYSTEM
EQUIPPED WITH RAPID
SHUTDOWN

TURN RAPID
SHUTDOWN
SWITCH TO THE
"OFF" POSITION TO
SHUT DOWN PV
SYSTEM AND REDUCE
SHOCK HAZARD
IN THE ARRAY.

Label Location:
SolarEdge/Delta M-Series Inverter
Per Code:
690.56(C)(1)(a)

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

DC VOLTAGE IS
ALWAYS PRESENT WHEN
SOLAR MODULES ARE
EXPOSED TO SUNLIGHT

Label Location:
(DC) (CB)
Per Code:
CEC 690.13.B

CAUTION
PHOTOVOLTAIC SYSTEM
CIRCUIT IS BACKFED

Label Location:
(D) (POI)
Per Code:
NEC 690.64.B.4

CAUTION
DUAL POWER SOURCE
SECOND SOURCE IS
PHOTOVOLTAIC SYSTEM

Label Location:
(POI)
Per Code:
NEC 705.12.B.3

PHOTOVOLTAIC AC
DISCONNECT

Label Location:
(AC) (POI)
Per Code:
NEC 690.13.B

PHOTOVOLTAIC POINT OF
INTERCONNECTION
WARNING: ELECTRIC SHOCK
HAZARD. DO NOT TOUCH
TERMINALS. TERMINALS ON
BOTH THE LINE AND LOAD SIDE
MAY BE ENERGIZED IN THE OPEN
POSITION. FOR SERVICE
DE-ENERGIZE BOTH SOURCE
AND MAIN BREAKER.
PV POWER SOURCE
MAXIMUM AC A
OPERATING CURRENT
MAXIMUM AC V
OPERATING VOLTAGE

Label Location:
(POI)
Per Code:
CEC 690.13.B

MAXIMUM AC A
OPERATING CURRENT
MAXIMUM AC V
OPERATING VOLTAGE

Label Location:
(AC) (POI)
Per Code:
NEC 690.54

(AC): AC Disconnect
(C): Conduit
(CB): Combiner Box
(D): Distribution Panel
(DC): DC Disconnect
(IC): Interior Run Conduit
(INV): Inverter With Integrated DC Disconnect
(LC): Load Center
(M): Utility Meter
(POI): Point of Interconnection

SOLAR ROOF

DATASHEET



ROOFING SYSTEM SPECIFICATIONS

CERTIFICATIONS

| | |
|-----------|--------------------|
| UL Listed | ETL Listed |
| UL 61730 | UL 790 Class A |
| UL 9703 | TAS100 |
| UL 1741 | ASTM D3161 Class F |

ELECTRICAL CHARACTERISTICS

Maximum open circuit voltage rating of connected branch circuits per diode (at STC): 13.34 V
Maximum series fuse rating: 10 A
Maximum system voltage: 600 V

ROOF PITCH RANGE

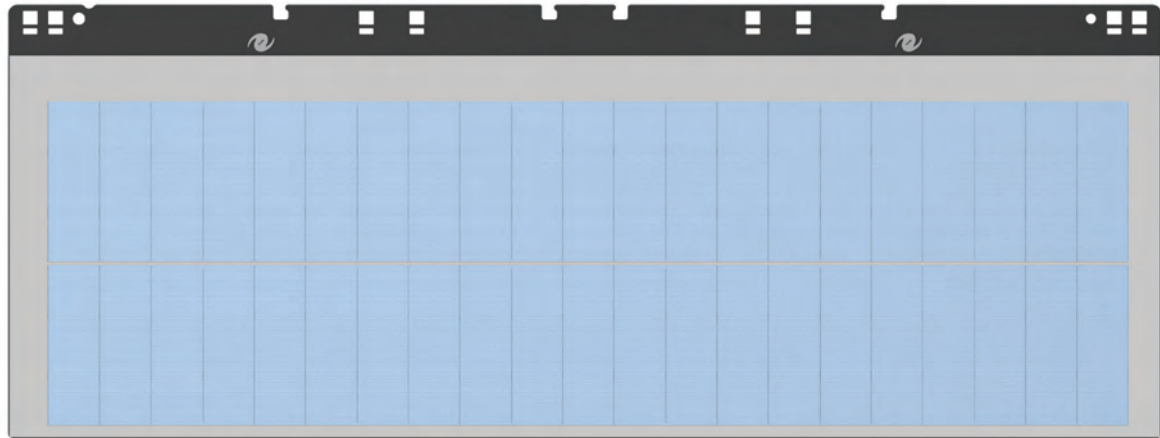
2:12 - 20:12

MODULE SPECIFICATIONS

MODEL #SR60T1 14-CELL MODULE

| Irradiance (W/m ²) | Temp. (Celsius) | Voc (V) | Vmp (V) | Isc (A) | Imp (A) | Pmax (W) |
|-----------------------------------|--------------------|------------|------------|------------|------------|-------------|
| 1000 | 25 | 13.34 | 10.99 | 5.65 | 5.32 | 58.47 |

These electrical characteristics are within ± 5% of the indicated values of Isc, Voc, and Pmax under standard test conditions (irradiance of 1000 W/m², AM 1.5 spectrum, and a cell temperature of 25 °C or 77 °F).



| | |
|-------------------------|--|
| Dimensions | 430 mm x 1140 mm Appx. 5 mm module thickness with 35.3 mm maximum height from deck |
| Principal Materials | Glass, Polymers, Fiberglass and Silicon |
| Installed System Weight | Textured Glass: 16.4 kg/m ² or 3.4 psf Installed weights include all components of system above roof sheathing |

ROOFING MODULES, FULL AND PARTIAL

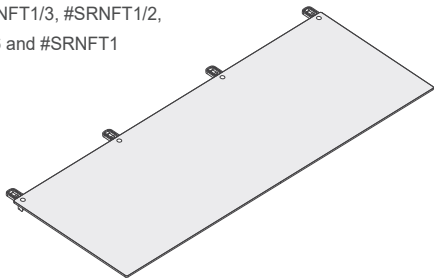
Model #SRNFT1/6, #SRNFT1/3, #SRNFT1/2, #SRNFT2/3, #SRNFT5/6 and #SRNFT1

Listed to UL 61730

Listed to UL 790 Class A

ASTM D3161 Class F

TAS100



PV MODULE

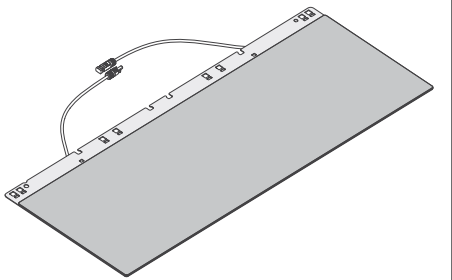
Model #SR60T1

Listed to UL 61730

UL 790 Class A

ASTM D3161 Class F

TAS100



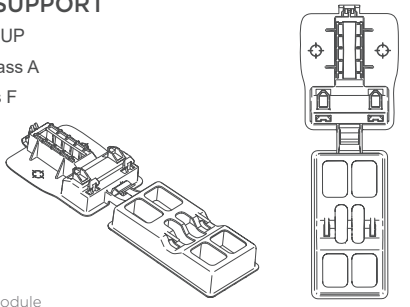
FOOT WITH SUPPORT

Model #SR-FOOTSUP

Listed to UL 790 Class A

ASTM D3161 Class F

TAS100



Center foot for PV module

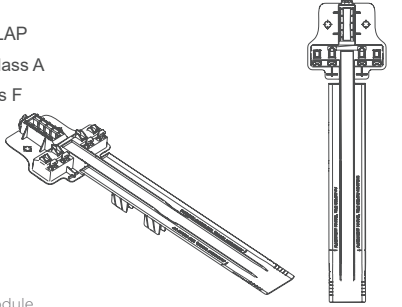
FOOTLAP

Model #SR-FOOTLAP

Listed to UL 790 Class A

ASTM D3161 Class F

TAS100



Edge foot for PV module

MCI RAPID SHUTDOWN

Model #EE-002605-003, Delta #GPI00010110

600V, 12A, NEMA 4X, MC4

Listed to UL 1741 PVRSE



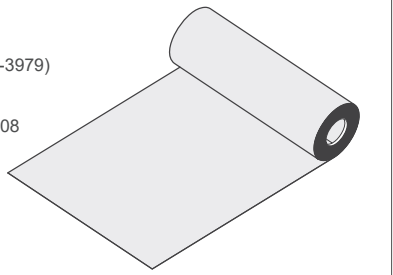
FIRESTONE UNDERLAYMENT

Clad-Gard SA FR

ASTM D226 Type I & II

Certified to ICC-ES AC188 (ESR-3979) and ASTM D1970

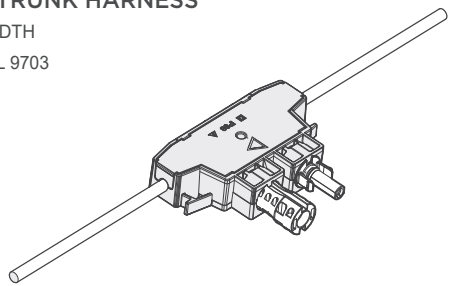
Class A Fire Rated per ASTM E108



DIODE TRUNK HARNESS

Model #SRDTH

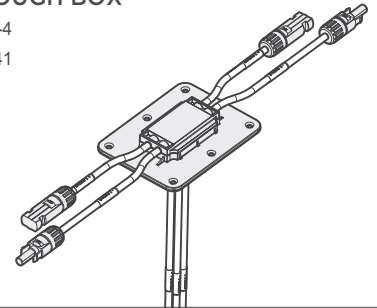
Listed to UL 9703



PASS THROUGH BOX

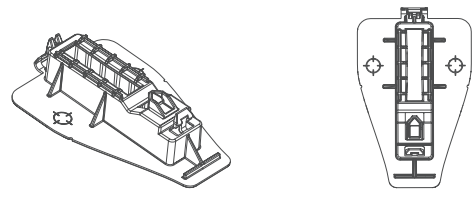
Model #SRPTB-4

Listed to UL 1741



ROOFING FOOT

Model #SR-FOOT

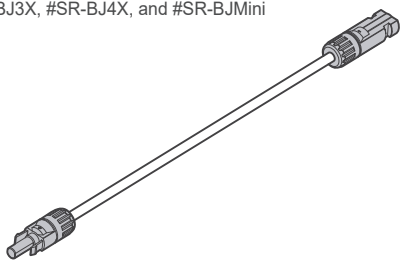


Center foot for Roofing module

BRANCH JUMPER

Model #SR-BJ2X, #SR-BJ3X, #SR-BJ4X, and #SR-BJMini

Listed to UL 9703





Single Phase Solar Inverter for North America

M4-TL-US | M5-TL-US | M6-TL-US | M8-TL-US | M10-TL-US | M10-4-TL-US



Key Features:

- Smart inverter with BLE, optional WiFi, Ethernet, 3G / 4G cellular communication
- Optional revenue grade meter (compliant with ANSI C12.20, Class 0.5)
- Support bi-directional cloud communication
- Support remote diagnosis and OTA
- Type 4 protection
- Built-in AFCI & Rapid shutdown controller
- CEC efficiency 97.5%
- UL 1741 SA, HECO compliant
- CA Rule 21 Phase 1 & 2 & 3 compliant



| Model | M4-TL-US | M5-TL-US | M6-TL-US | M8-TL-US | M10-TL-US | M10-4-TL-US |
|-------------------------------------|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| INPUT (DC) | | | | | | |
| Max. system voltage | 600 V | | | | | |
| Nominal voltage | 380 V | | | | | |
| Max. operating voltage | 540 V | | | | | |
| Operating MPPT voltage range | 50 V to 480 V | | | | | |
| Max. input current per MPPT | 12 A | 12 A | 12 A | 12 A | 20 A | 10 A |
| Max. short circuit current per MPPT | 15 A | 15 A | 15 A | 15 A | 30 A | 15 A |
| Max. DC/AC ratio | 1.3 | | | | | |
| DC disconnect | Integrated | | | | | |
| MPP tracker | 2 | 2 | 3 | 3 | 2 | 4 |
| Input strings available | 2 - 2 | 2 - 2 | 2 - 2 - 2 | 2 - 2 - 2 | 2 - 2 | 2 - 2 - 2 - 2 |
| OUTPUT (AC) | | | | | | |
| Nominal output power @ 240Vac | 3840 W | 4800 W | 5760 W | 7680 W | 9600 W | 9600 W |
| Max. output power @ 240Vac | 4000 W | 5000 W | 6000 W | 8000 W | 10000 W | 10000 W |
| Nominal output power @ 208Vac | 3328 W | 4160 W | 4992 W | 6656 W | 8320 W | 8320 W |
| Max. output power @ 208Vac | 3648 W | 4560 W | 5472 W | 7296 W | 9120 W | 9120 W |
| AC operating voltage range | 183 Vac to 228 Vac @ 208 Vac 211 Vac to 264 Vac @ 240 Vac | | | | | |
| Max. continuous current | 16 A | 20 A | 24 A | 32 A | 40 A | 40 A |
| Nominal operating frequency | 60 Hz | | | | | |
| Operating frequency range | 59.3 Hz to 60.5 Hz | | | | | |
| Adjustable frequency range | 50 Hz to 66 Hz | | | | | |
| Night consumption | < 1.5 W ¹⁾ | | | | | |
| THD @ nominal power | < 3 % | | | | | |
| Power factor @ nominal power | > 0.99 | | | | | |
| Adjustable power factor range | 0.85i to 0.85c | | | | | |
| GENERAL SPECIFICATION | | | | | | |
| Max. efficiency | 98% | | | | | |
| CEC efficiency | 97.0 % @ 208 V 97.5 % @ 240 V | 97.5 % @ 208 V 97.5 % @ 240 V | 97.0 % @ 208 V 97.5 % @ 240 V | 97.5 % @ 208 V 97.5 % @ 240 V | 97.5 % @ 208 V 97.5 % @ 240 V | 97.0 % @ 208 V 97.5 % @ 240 V |
| Operating temperature range | -22 °F to 149 °F (-30 °C to 65 °C) with derating above 113 °F (45 °C) | | | | | |
| Storage temperature range | -40 °F to 185 °F (-40 °C to 85 °C) | | | | | |
| Humidity | 0% to 95% | | | | | |
| Max. operating altitude | 9,843 ft (3,000 m) | | | | | |
| Acoustic noise | < 45 dB(A) @ 3 ft (1m) | | | | | |



Solar Inverter for North America

| Model | M4-TL-US | M5-TL-US | M6-TL-US | M8-TL-US | M10-TL-US | M10-4-TL-US |
|----------------------------------|--|--------------------|--------------------|--------------------------------------|--------------------|--------------------|
| MECHANICAL DESIGN | | | | | | |
| Dimensions (W x H x D) | 16.7 x 23.2 x 5.9 in (425 x 590 x 150 mm) | | | | | |
| Display | LED indicators | | | | | |
| Weight ²⁾ | 41.9 lbs (19.0 kg) | 41.9 lbs (19.0 kg) | 44.3 lbs (20.1 kg) | 45.2 lbs (20.5 kg) | 47.6 lbs (21.6 kg) | 47.6 lbs (21.6 kg) |
| Cooling | Natural convection | | | Natural convection with internal fan | | |
| DC connection | Spring contact type | | | | | |
| AC connection | Spring contact type | | | | | |
| Rapid Shutdown Initiation Method | Loss of AC or DC Disconnect | | | | | |
| Communication interface | BLE, optional WiFi, Ethernet, 3G / 4G cellular communication | | | | | |
| Enclosure material | Die-casting aluminum | | | | | |
| STANDARDS | | | | | | |
| Enclosure protection rating | Type 4 | | | | | |
| Safety | UL 1741, CSA-C22.2 No. 107.1-01 | | | | | |
| Software approval | UL 1998 | | | | | |
| Ground fault protection | UL 1741 CRD | | | | | |
| Anti-islanding protection | IEEE 1547, IEEE 1547.1 | | | | | |
| EMC | FCC part 15 Class B | | | | | |
| AFCI | UL 1699B (Type 1), NEC 2017 Article 690.11 | | | | | |
| Rapid shutdown protection | NEC 2017 690.12 ³⁾ | | | | | |
| Integrated meter | ANSI C12.20, Class 0.5 | | | | | |
| Grid support regulation | UL 1741 SA, California Rule 21 phase 1 & 2 & 3, HECO Compliant | | | | | |
| WARRANTY | | | | | | |
| Standard warranty | 10 years | | | | | |

- 1) Without consumption of communication card
- 2) Without weight of revenue grade meter
- 3) Compliant with Tigo rapid shutdown system or APS rapid shutdown system



Delta Electronics (Americas), Ltd.
46101 Fremont Blvd, Fremont, CA 94538
Sales Email: Inverter.Sales@deltaww.com
Support Email: Inverter.Support@deltaww.com
Sales Hotline: +1-877-440-5851 or +1-626-369-8021
Support Hotline: +1-877-442-4832
Support (Intl.): +1-626-369-8019
Monday to Friday from 6am to 6pm PST (apart from Holidays)
www.Delta-Americas.com





Accessory: MCI (Middle Circuit Interrupter)

Features:

- Automatic function test upon startup, ensure safety
- Enclosure protection Type 4
- Meet 2017 NEC Article 690.12 Rapid Shutdown
- No installation needed for every PV Module, make better cost performance for PV system
- With PLC, no additional cable needed

| INPUT RATINGS | | |
|-------------------------------|---|--|
| Delta part number | GPI00010110 | GPI00010114 |
| Maximum system voltage | 600 Vdc | |
| Rated input operating voltage | 6 Vdc to 80 Vdc | |
| Number of input circuit | 1 | |
| Startup voltage | 22 V | |
| Rated input current | 12 A | |
| OUTPUT RATINGS | | |
| Rated output current | 12 A | |
| Control signal method | PLC signal | |
| GENERAL DATA | | |
| Dimensions (W x H x D) | 4.6 x 6.5 x 3.0 in (117 x 165 x 76.5 mm) (without cable) | 3.8 x 6.5 x 1.1 in (97.3 x 165 x 27.3 mm) (without cable) |
| Weight | 2.0 lbs (0.9 kg) | 1.4 lbs (0.64 kg) |
| Bracket | Groove adapter bracket | Without |
| Cooling | Natural convection | |
| DC input / output connectors | MC4 PV connector | |
| Cable length with connector | Input : 5.9 in (150 mm) Output: 47.2 in(1200 mm) | Input : 5.9 in (150 mm) Output : 12 in (305 mm) |
| Enclosure material | Plastic | |
| Operating temperature | -40 °F to 185 °F (-40 °C to 85 °C) | |
| Storage temperature | -40 °F to 185 °F (-40 °C to 85 °C) | |
| Humidity | 0% to 95% | |
| Maximum operating altitude | 9,843 ft (3,000 m) above sea level | |
| Self power consumption | <3.0 W | |
| Warranty | 10 years | |
| STANDARD COMPLIANCE | | |
| Enclosure protection rating | Type 4 / IP67 | |
| Safety | UL 1741, CSA C22.2 No. 330-17 | |
| Rapid shutdown | NEC 2017 Article 690.12 | |
| EMC | FCC Part 15 Class B | |

PV RSA Model: Solarglass Roof Rapid Shutdown Array
Category QIJR, Report Date: 2020-05-01

TABLE OF ESSENTIAL ELEMENTS

| Function | Manufacturer | Model No. | Firmware Versions and Checksums | Certification Standard |
|--|-------------------|---|--|------------------------|
| PVRSE Mid Circuit Interrupter (MCI) | Delta Electronics | GPI00010114 ² | 2.1.6 | UL 1741 PVRSE |
| Inverter | Delta Electronics | M4, M5, M6, M8, M10 | Sys: 2.2.11 Pwr: 1.4.9 Safety: 1.4.3 | UL 1741 |
| PV Module | Tesla | SR60T1 | N/A | UL 61730 |
| Diode Harness | Tesla | SRDTH | N/A | UL 9703 |
| PV Wire Jumper(s) | Tesla | SR-BJ2X, SR-BJ3X, SR-BJ4X, SR-BJMini | N/A | UL 9703 |
| Pass-Through Box | Tesla | SRPTB-4 | N/A | UL 1741 |
| PV RSA Initiator ¹ (See installation req. below) | Non-Specific | N/A | N/A | N/A |

1 Dedicated PV system AC circuit breaker or AC disconnect switch, labeled per NEC 690.12 requirements.

2 Applies to variations of this part number, e.g. suffixes.

Note: PVRSA installation requirements may reduce the effective equipment and component ratings below the individual equipment and component PVRSE ratings in order to achieve PVRSA shock hazard reduction requirements.

PV RSA INSTALLATION REQUIREMENTS

| | |
|---|-------------------------------------|
| Max System Voltage | 600 Vdc |
| Max Array Internal Voltage After Actuation | 165 Vdc (cold weather open circuit) |
| Max Series-Connected Panels between MCI Output Connections: | 10 |
| Max Series-Connected Panels Connected to MCI Inputs: | 5 |

OTHER INSTALLATION INSTRUCTIONS

1. MCIs shall be positioned at a slight angle during installation on roof deck to assist with water shedding.
2. An MCI must be connected to one end of each series string or mounting plane sub-array string.
3. Verification that MCIs are installed with 10 or fewer modules between MCI output connections shall be documented for inspection, by voltage measurement logs and/or as-built string layout diagrams.
4. The dedicated PV system AC circuit breaker or PV system AC disconnect switch shall serve as the PVRSA initiator and shall be sized and installed in accordance with NEC requirements. The specific part shall be identified on the as-built system drawings.



Certification Mark of UL on the installation instructions is the only method provided by UL to identify products manufactured under its Certification and Follow-Up Service. The Certification Mark for these products includes the UL symbol, the words "CERTIFIED" and "SAFETY", the geographic identifier(s), and a file number.

87 Pleasant Historical Application

1 message

Lynelle Mastromarino <lmastromarino@tesla.com>
 To: "ahdc@town.arlington.ma.us" <ahdc@town.arlington.ma.us>
 Cc: Carol Greeley <carol.greeley@gmail.com>

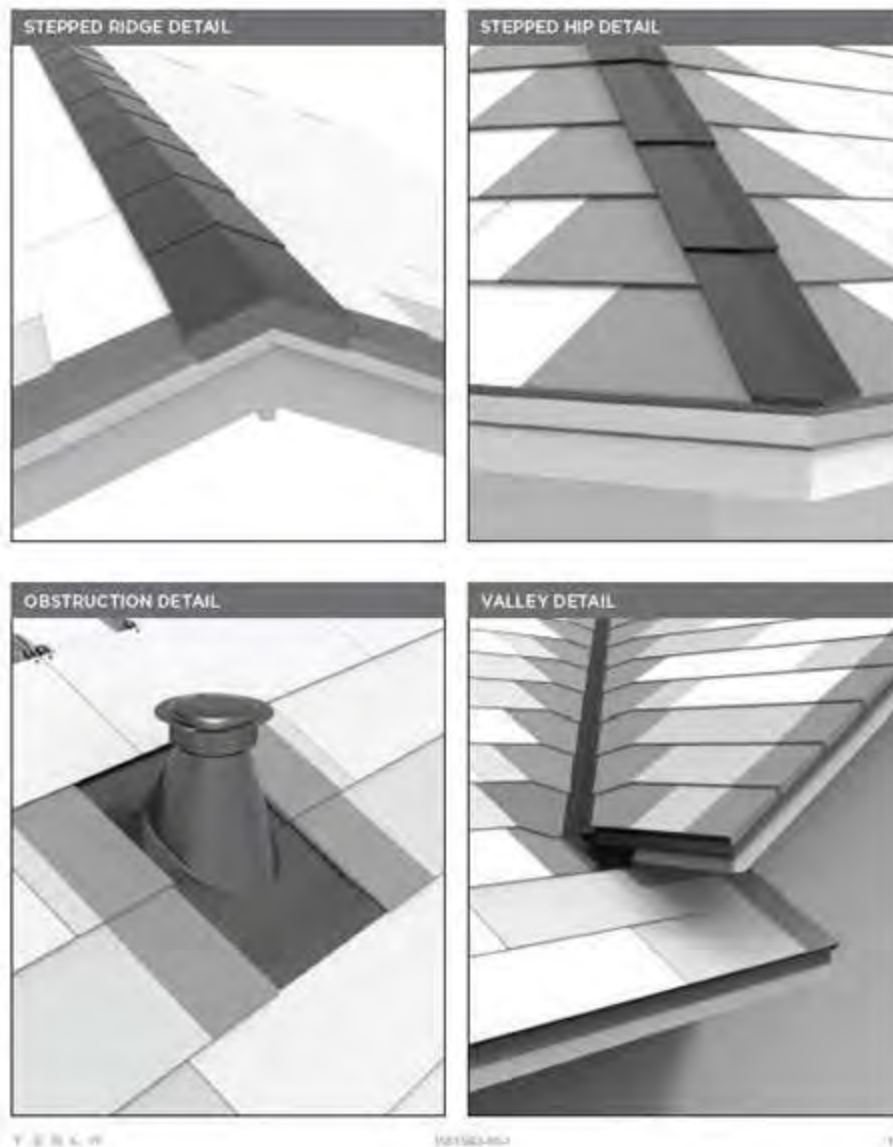
Fri, Aug 28, 2020 at 11:34 AM

Good morning,

I've attached imagery at request of the historical commission for the Solar Roof application for 87 Pleasant. I've also included the install manual for reference.

On page 11 you will find more images regarding the flashing/transition components (also seen below):

FLASHING COMPONENTS



Thank you,

Lynelle Mastromarino

Permit Coordinator | Operations

240 Ballardvale St. Unit A Wilmington, MA 01887

E. lmastromarino@tesla.com T. 978.956.3146

TESLA

11 attachments



Dormer and Valley close up.jpg
205K



Dormer and valley.jpg
233K



Flat roof.jpg
6884K



Ridge_ Hips_ Vents.JPG
155K



Roof Pullback.JPG
95K



SR Historical Home front.jpg
1015K



SR Historical home side.jpg
679K



SR Ridge.jpg
246K



SR.jpg
185K

SR close up.jpg
245K



19



Solarglass Roof V3 Installation Manual 8_13_20.pdf

11650K

Michael's Photographs



SOLAR ROOF

INSTALLATION MANUAL



DISCLAIMER OF LIABILITY

Tesla Incorporated (“Tesla”) and its subsidiaries are not liable for any damages caused by failure to follow the instructions and guidelines found in this manual, or from inappropriate use or maintenance of PV Modules. This includes, without limitation, any damages, losses, and expenses caused by non-observance of the instructions of this manual, as well as damages, losses, and expenses caused by, or in connection with, products of other manufacturers.

NOTICES

The information in this manual is believed to be reliable, but does not constitute an express or implied warranty. Tesla reserves the right to make changes to its PV Modules and other products,

Tiles, Partial Tiles, the Prepared

manufactured by T

CONTACT INFORMATION

SOLAR SYSTEMS TECHNICAL PUBLICATIONS

solarsystemstechpubs@tesla.com

TESLA, INC

3500 Deer Creek Road

Palo Alto, CA 94304 U.S.A.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE IMPORTANT SAFETY INSTRUCTIONS

All instructions must be read and understood before attempting to install, wire, operate, or maintain a PV system. Failure to read and comply with any of the limitations noted herein can result in property damage, serious bodily injury, or death.

The installer assumes the risk of all injury that might occur during installation, including, without limitation, the risk of electric shock.

Tesla Solar Roof is engineered to safely withstand applicable live loads required by building code for steep slope applications. However, to ensure safety and maintain maximum roof life, walking on a Solar Roof should be avoided except by trained T responders. This is a common recommendation for other high-end roof types, including slate, clay, concrete, and composite tile products.

- knowledge.
- Abide by local, regional, and national statutory regulations when installing the system, and obtain a building permit if necessary.
- Use equipment, connectors, and wiring suitable for solar electric systems.
- Work under dry conditions and use dry tools.
- Use fall protection when working from heights of 6 feet (183 cm) or above. Follow Occupational Safety and Health Act (OSHA) or local governing safety regulations regarding Fall Protection.
- Use insulated tools that are approved for working on electrical installations.
- Wear suitable personal protection equipment (PPE) to prevent the risk of personal injury, such as fall hazards or electrical hazards.
- .

NOTE TO TRAINED PROFESSIONALS



DANGER:

Tesla Solar Roof is slippery and is a fall hazard. Only access a Solar Roof with appropriate safety equipment and while wearing personal fall protection. An approved and safe walking platform should be used when accessing the roof to prevent falls, and damage to the roof. In addition, skylights, roof openings and light transfer panels must be covered with approved covering to prevent falls.



DANGER:

particular hazards from the PV system, and stay away from all elements of the PV system during

SOLAR ROOF MODULE INFORMATION

24

CERTIFICATIONS

| UL Listed | ETL Listed |
|-----------|--------------------|
| UL 61730 | UL 790 Class A |
| UL 9703 | TAS100 |
| UL 1741 | ASTM D3161 Class F |

ELECTRICAL CHARACTERISTICS

Maximum open circuit voltage rating of connected branch circuits per diode (at STC): 13.34 V

Maximum series fuse rating: 10A

Maximum system voltage: 1000 V (for installations above 2000m but below 3000m the system voltage is 877 V)

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T

T

Protection Class: II

Ambient temperature range: -40 °C to +40 °C

Wire: 12 AWG, PV wire, 90 °C wet or dry

Only PV connectors compatible with type PV-KST4/6II-UR or type PV-KST4-EVO2 (male), PV-KBT4/6II-UR or PV-KBT4-EVO2 (female) from Staubli may be used to connect to the PV module.

MODEL #SR60T1 14-CELL MODULE

| Irradiance (W/m²) | Temp. (Celsius) | Voc (V) | Vmp (V) | Isc (A) | Imp (A) | Pmax (W) |
|----------------------|--------------------|------------|------------|------------|------------|-------------|
| 1000 | 25 | 13.34 | 10.99 | 5.65 | 5.32 | 58.47 |

These electrical characteristics are within ± 5% of the indicated values of Isc, Voc, and Pmax under standard test conditions (irradiance of 1000 W/m², AM 1.5 spectrum, and a cell temperature of 25 °C or 77 °F).



| | |
|-------------------------|--|
| Dimensions | 430 mm x 1140 mm Appx. 5 mm module thickness with 35.3 mm maximum height from deck |
| Principal Materials | Glass, Polymers, Fiberglass and Silicon |
| Installed System Weight | Textured Glass: 16.4 kg/m² or 3.4 psf Installed weights include all components of system above roof sheathing |

PVRSR Model: Solarglass Roof Rapid Shutdown Array

Category QIJR, Report Date: 2020-05-01

TABLE OF ESSENTIAL ELEMENTS

| Function | Manufacturer | Model No. | Firmware Versions and Checksums | |
|---|-------------------|---|--|---------------|
| PVRSE Mid Circuit Interrupter (MCI) | Delta Electronics | GPI00010114 ² | 2.1.6 | UL 1741 PVRSE |
| Inverter | Delta Electronics | M4, M5, M6, M8, M10 | Sys: 2.2.11 Pwr: 1.4.9 Safety: 1.4.3 | UL 1741 |
| PV Module | Tesla | SR60T1 | N/A | UL 61730 |
| Diode Harness | Tesla | SRDTH | N/A | UL 9703 |
| PV Wire Jumper(s) | Tesla | SR-BJ2X, SR-BJ3X, SR-BJ4X, SR-BJMini | N/A | UL 9703 |
| Pass-Through Box | Tesla | SRPTB-4 | N/A | UL 1741 |
| PVRSR Initiator ¹ (See installation req. below) | | N/A | N/A | N/A |

1 Dedicated PV system AC circuit breaker or AC disconnect switch, labeled per NEC 690.12 requirements.

2 Applies to variations of this part number, e.g. suffixes.

Note: PVRSR installation requirements may reduce the effective equipment and component ratings below the individual equipment and component PVRSE ratings in order to achieve PVRSR shock hazard reduction requirements.

PVRSR INSTALLATION REQUIREMENTS

| | |
|---|-------------------------------------|
| Max System Voltage | 600 Vdc |
| Max Array Internal Voltage After Actuation | 165 Vdc (cold weather open circuit) |
| Max Series-Connected Panels between MCI Output Connections: | 10 |
| Max Series-Connected Panels Connected to MCI Inputs: | 5 |

OTHER INSTALLATION INSTRUCTIONS

- MCIs shall be positioned at a slight angle during installation on roof deck to assist with water shedding.
- An MCI must be connected to one end of each series string or mounting plane sub-array string.
- V measurement logs and/or as-built string layout diagrams.
- The dedicated PV system AC circuit breaker or PV system AC disconnect switch shall serve as the PVRSR initiator and shall be sized and installed in accordance with NEC requirements.



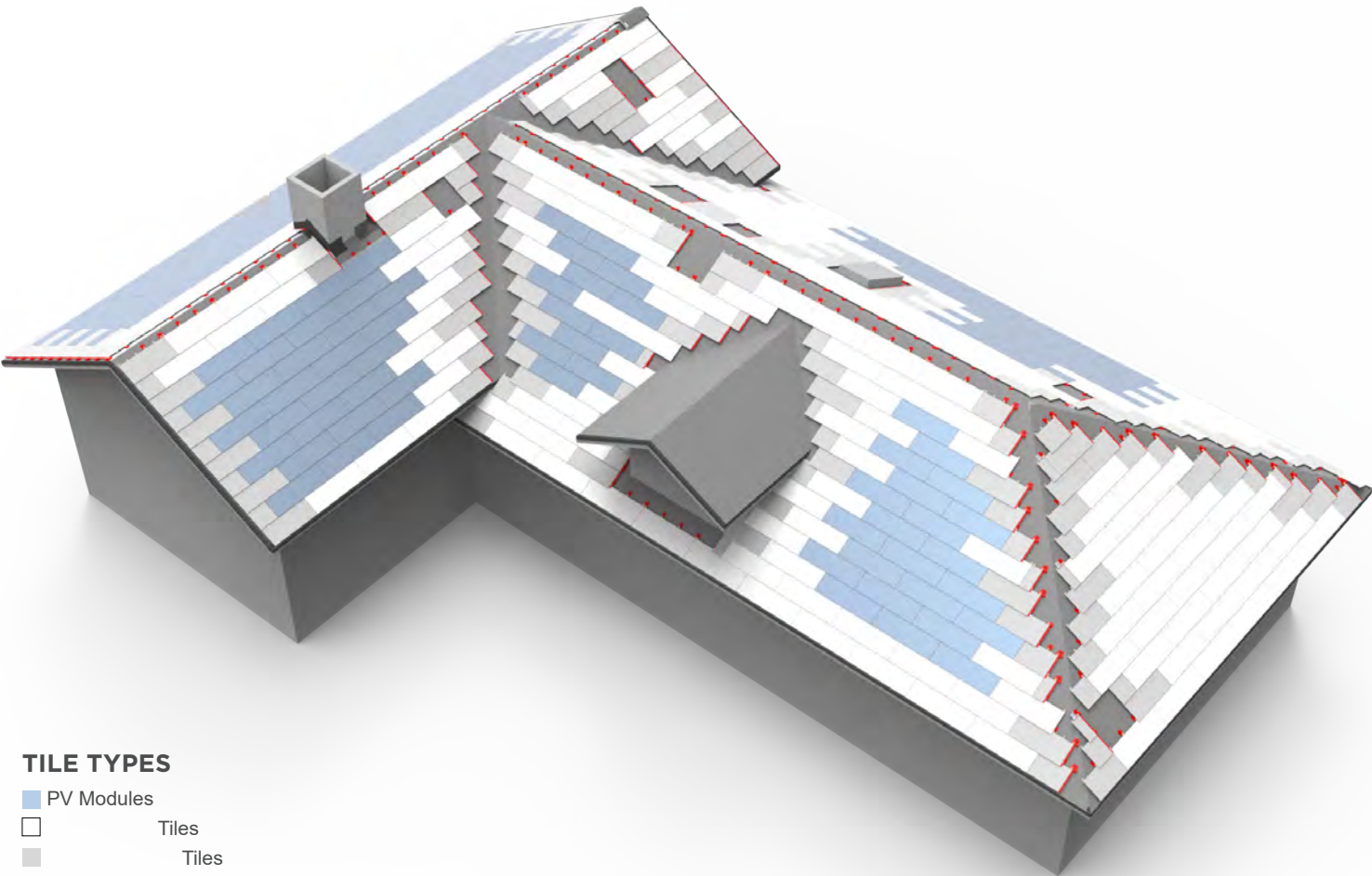
on the installation instructions is the only method provided by UL to identify products manufactured under its symbol, the words "CERTIFIED" and

SOLAR ROOF SYSTEM OVERVIEW

26

A Solar Roof functions in fundamentally the same way as traditional roof-mounted PV systems. Sunlight is converted to DC electricity at each individual module. Individual modules are connected in series using diode harnesses to form a complete PV “string.” One or more strings connect in parallel at a typical string inverter to convert power to AC.

| TRADITIONAL PV | TESLA SOLAR ROOF |
|---|---|
| DC modules | DC modules |
| Tempered glass | Tempered glass |
| Silicon cells | Silicon cells |
| Backsheet & encapsulant | Backsheet & encapsulant |
| Module J-boxes, PV wire and Listed connectors | Module J-boxes, pv wire and Listed connectors |
| Series strings below 600 V | Series strings below 600 V |
| DC - AC inverters | DC - AC inverters |
| Rapid shutdown (2014 or 2017) | Rapid shutdown (2014 or 2017) |



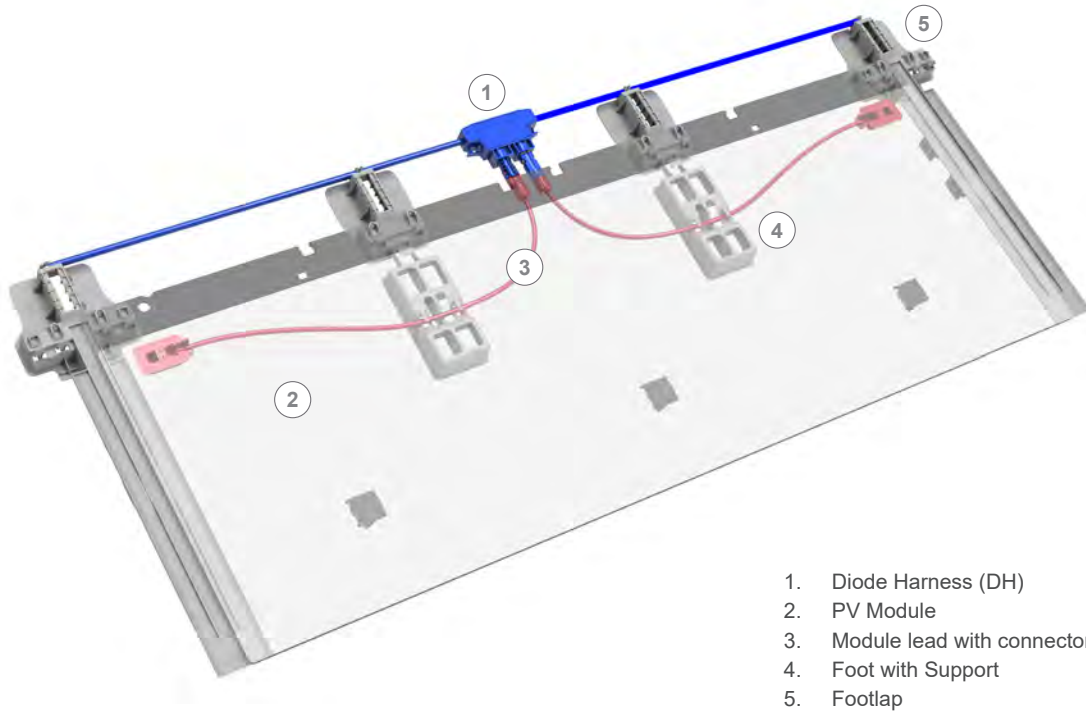
TILE TYPES
■ PV Modules
□ Tiles
■ Tiles

ELECTRICAL SYSTEM COMPONENTS

27

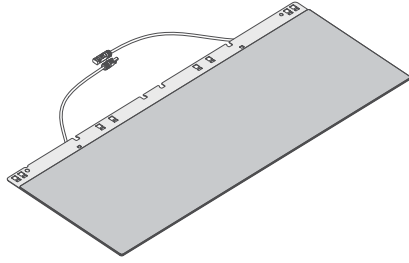
must follow plan set when possible.

team. Field changes may cause BOM change (Diode Harness length and count, Jumper length and count, Partial Tile count).



PV MODULE

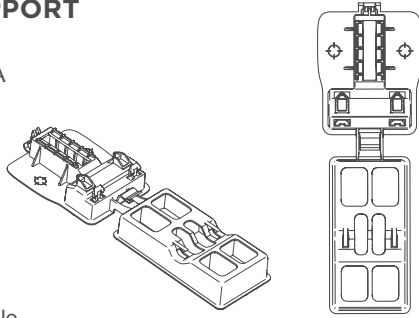
Model #SR60T1
Listed to UL 61730
UL 790 Class A
ASTM D3161 Class F
TAS100

**MCI RAPID SHUTDOWN**

Model #EE-002605-003, Delta #GPI00010110
600V, 12A, NEMA 4X, MC4
Listed to UL 1741 PVRSE

**FOOT WITH SUPPORT**

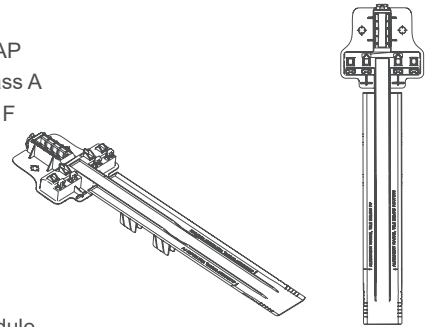
Model #SR-FOOTSUP
Listed to UL 790 Class A
ASTM D3161 Class F
TAS100



Center foot for PV module

FOOTLAP

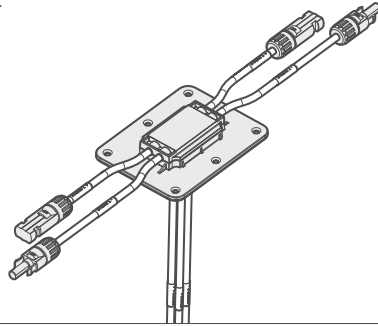
Model #SR-FOOTLAP
Listed to UL 790 Class A
ASTM D3161 Class F
TAS100



Edge foot for PV module

PASS THROUGH BOX

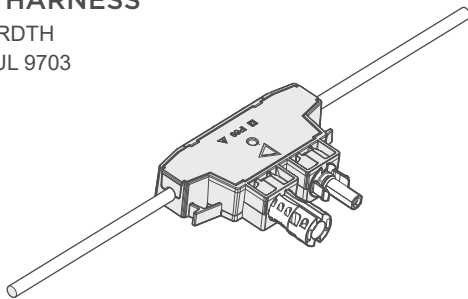
Model #SRPTB-4
Listed to UL 1741



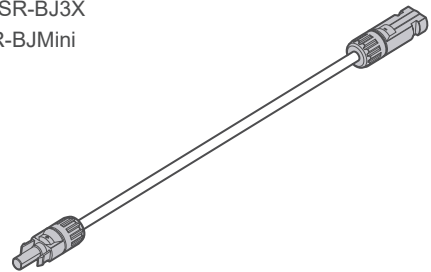
Provides a method of transferring up to 2 PV source circuits through the roof decking to inverters or additional PV arrays.

DIODE HARNESS

Model #SRDTH
Listed to UL 9703

**JUMPER**

Model #SR-BJ2X, #SR-BJ3X
#SR-BJ4X, and #SR-BJMini
Listed to UL 9703

**BRANCH SOCKET, STAUBLI**

Model #PV-AZB4
Listed to UL 6703

**BRANCH PLUG, STAUBLI**

Model #PV-AZS4
Listed to UL 6703



ROOFING SPECIFICATIONS

29

SHEATHING REQUIREMENTS

T

- Exterior grade plywood: 15/32" nominal thickness or greater
- OSB: 7/16" nominal thickness or greater
-

Do not install Tesla Solar Roof over widely spaced sheathing boards (sometimes referred to as

Verify the capacity of the existing structure to carry this additional load. As this procedure is beyond the scope of this manual, contact T

ROOF PITCH RANGE

2:12 - 20:12

UNDERLAYMENT

Firestone Clad-Gard SA FR

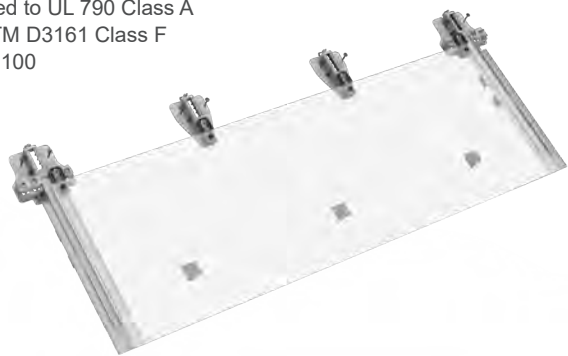
- Meets or exceeds requirements of ASTM D226 Type I & II
- AC188 (ESR-3979) and ASTM D1970
- Class A Fire Rated per ASTM E108



ROOFING TILES AND PARTIALS

ROOFING TILES, FULL AND PARTIALS

Listed to UL 61730
Listed to UL 790 Class A
ASTM D3161 Class F
TAS100



T

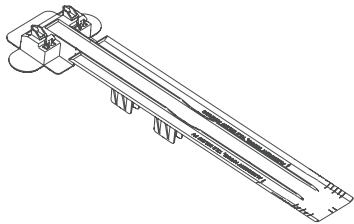
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to accommodate all areas of the mounting plane and are cross compatible with the PV Module hardware. The center foot is The Reduced Footlap is used as an alternate edge foot.

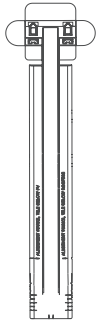


REDUCED FOOTLAP

Model # SR-RFOOTLAP

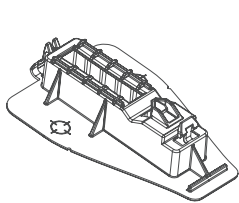


Tile

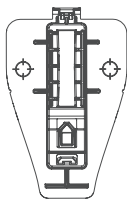


ROOFING FOOT

Model #SR-FOOT

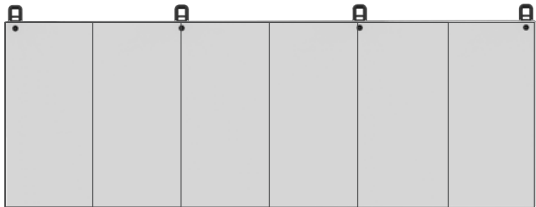


Tile



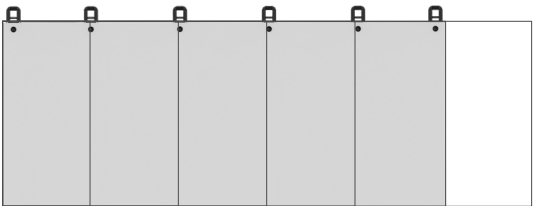
FULL TILE

Model #SRNFT1



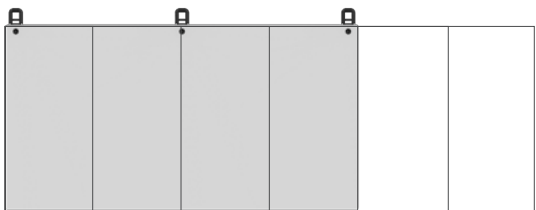
5/6 PARTIAL TILE

Model #SRNFT5/6



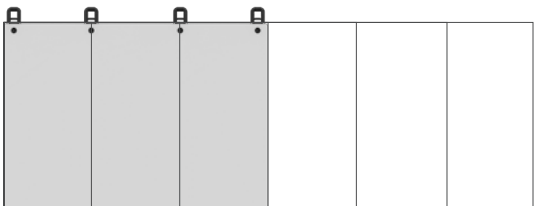
2/3 PARTIAL TILE

Model #SRNFT2/3



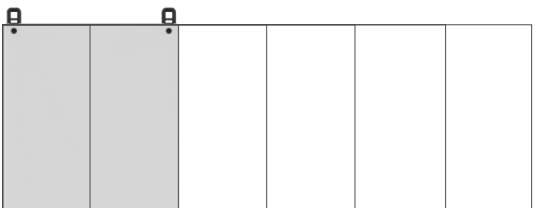
1/2 PARTIAL TILE

Model #SRNFT1/2



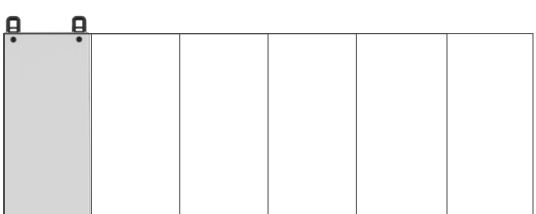
1/3 PARTIAL TILE

Model #SRNFT1/3



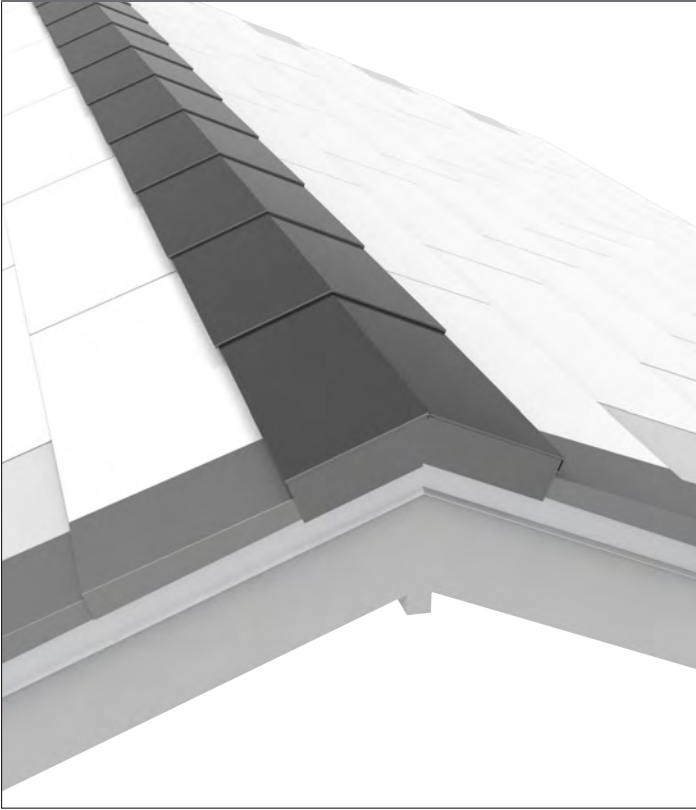
1/6 PARTIAL TILE

Model #SRNFT1/6



FLASHING COMPONENTS

STEPPED RIDGE DETAIL



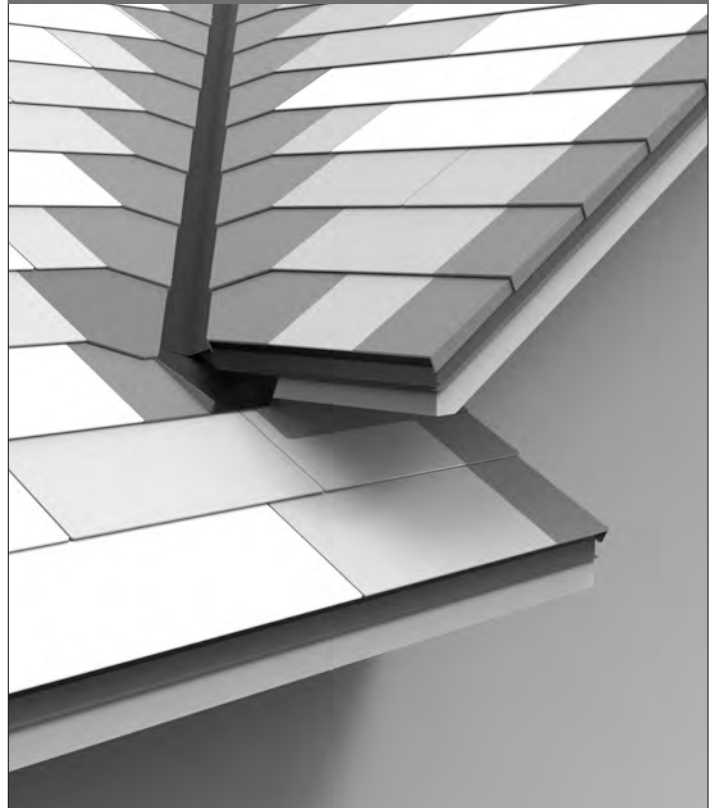
STEPPED HIP DETAIL



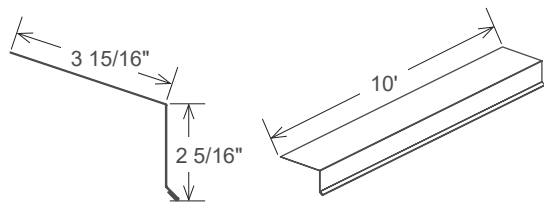
OBSTRUCTION DETAIL



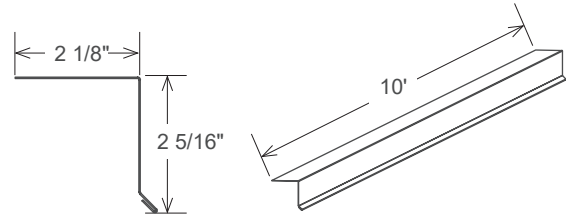
VALLEY DETAIL



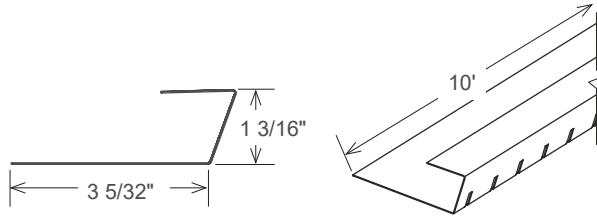
FLASHING, EAVE



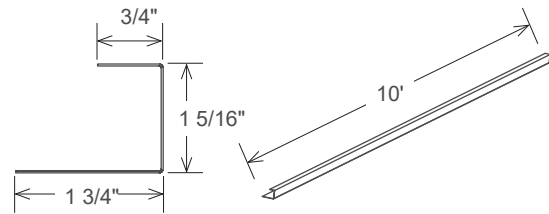
FLASHING, RAKE



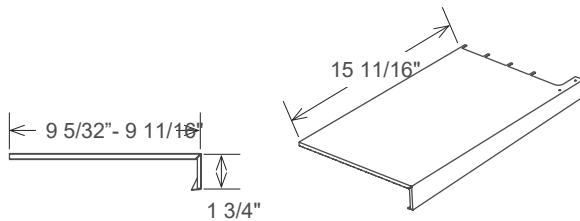
TRIM, STARTER



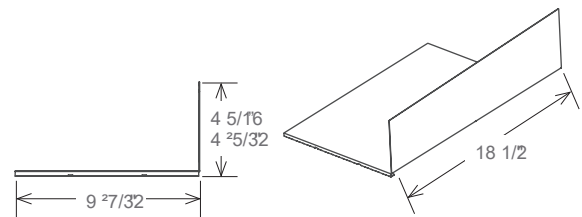
DECK, C CHANNEL



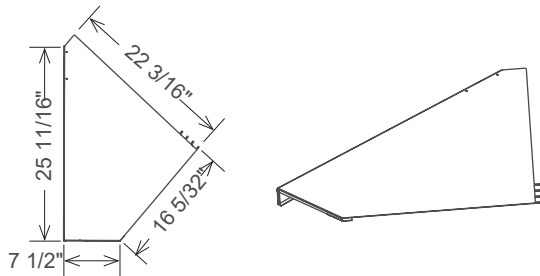
TRIM, RAKE



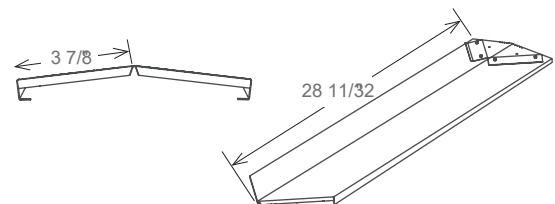
FLASHING, SIDEWALL STEP



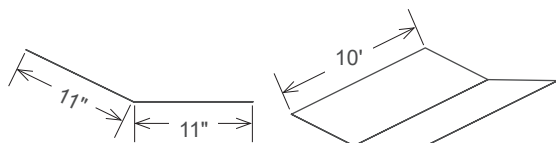
TRIM, VALLEY



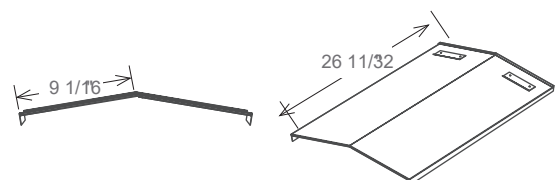
FLASHING, HIP CAP



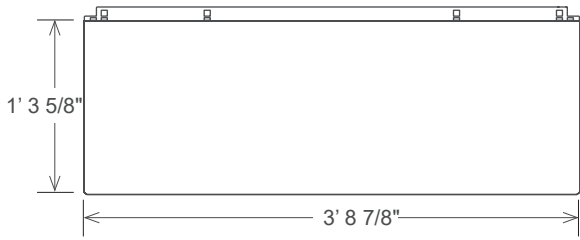
FLASHING, VALLEY



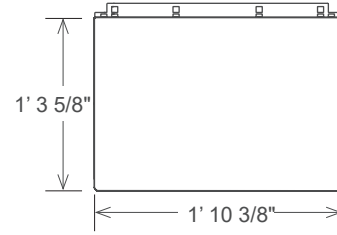
FLASHING, CAP, RIDGE



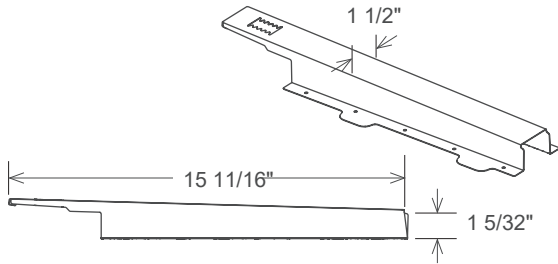
METAL TILE, FULL



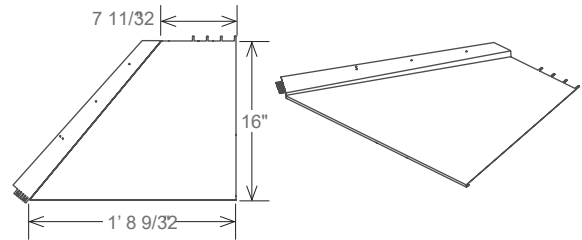
METAL TILE, HALF



FLASHING, SUPPORT BRACKET, METAL TILE

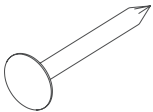


TRIM, HIP

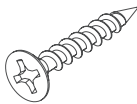


FASTENERS

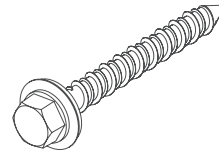
NAIL, RING SHANK ROOFING .120" x 1.25", COLLATED, HDG



SCREW, PHILLIP BUGLEHEAD, DK #8 X 1" COATED



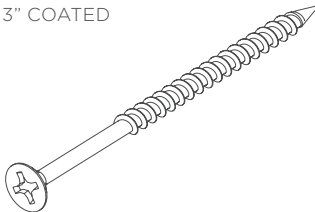
SCREW, CONCRETE 0.25" X 2.25", HEX WASHER STAINLESS STEEL



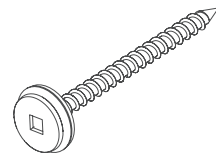
SCREW, PHILLIP, MODIFIED TRUSS HEAD, SELF DRILLING #8-18 x .5", STAINLESS STEEL



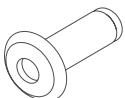
SCREW, PHILLIP BUGLEHEAD #8 X 3" COATED



SCREW, SQUARE DRIVE CONCEALOR BONDED WASHER #10-13 x 2", GALVANIZED



RIVET, BLIND, DOMED 0.125" OD 0.125-0.187" MATERIAL THICKNESS



WASHER, BONDED SEALING, 0.25", STAINLESS STEEL



ELECTRICAL SAFETY PRECAUTIONS

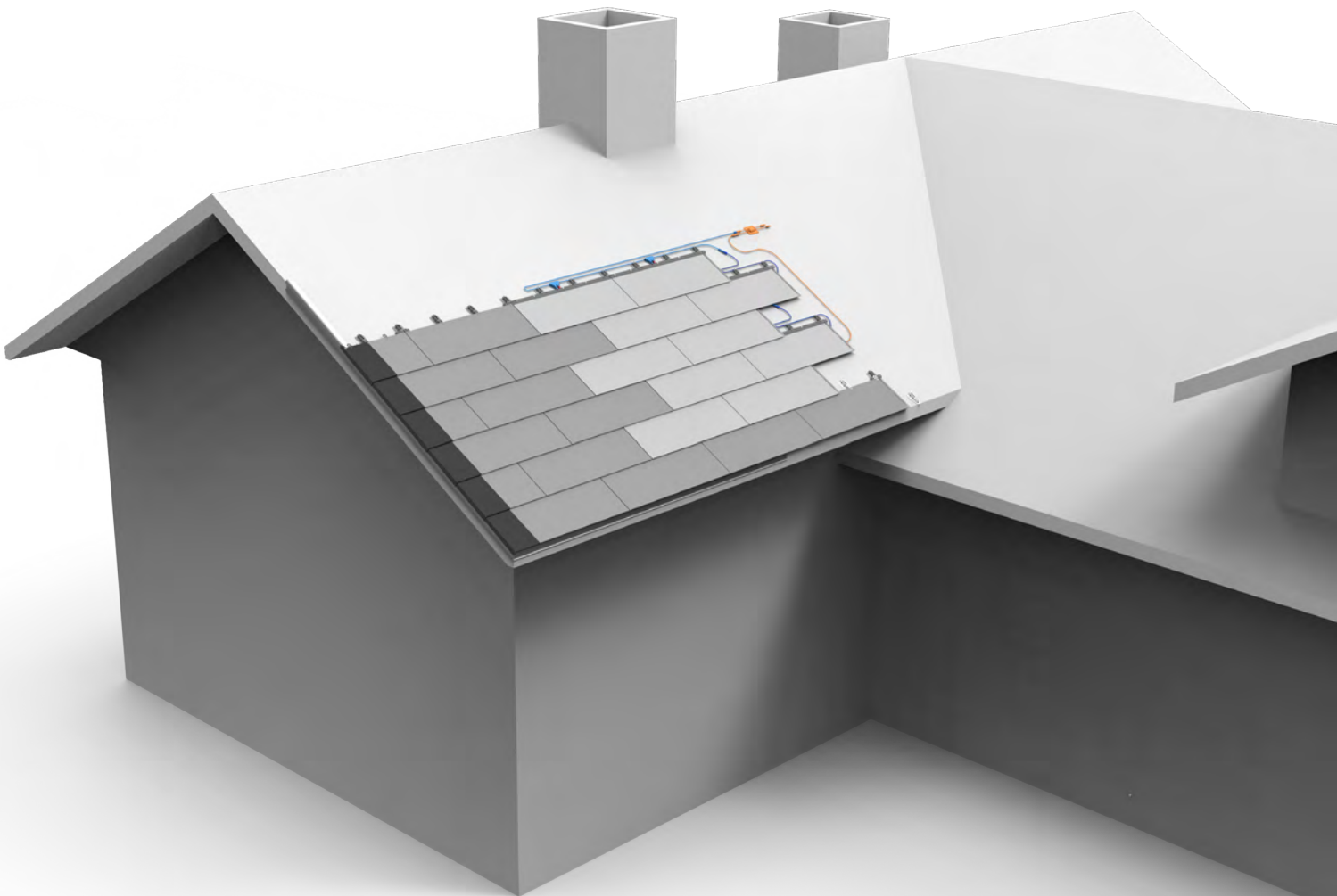
A PV Module may experience conditions that produce more current and/or voltage than reported at standard test conditions. Follow the requirements of the National Electrical Code (NEC) in Article 690 to address these increased outputs. In installations not under the requirements of the NEC, multiply the values of I_{sc} and V_{oc} marked on the Solar Roof PV Modules by a factor of 1.25 when determining component voltage ratings, conductor ampacities, overcurrent device ratings, and size of controls connected to the PV output.

PV MODULES AND WIRING CANNOT INTERACT WITH METAL FLASHINGS

Once energized, all components of the Solar Roof photovoltaic DC circuit, including the Diode Trunk Harness, all conductors, and the Pass
The
plan set.

at the ridge.

Never locate PV Modules on the mounting plane where they may contact transition, headwall,



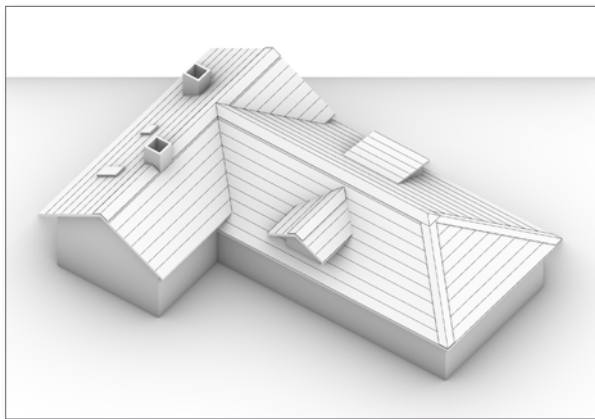
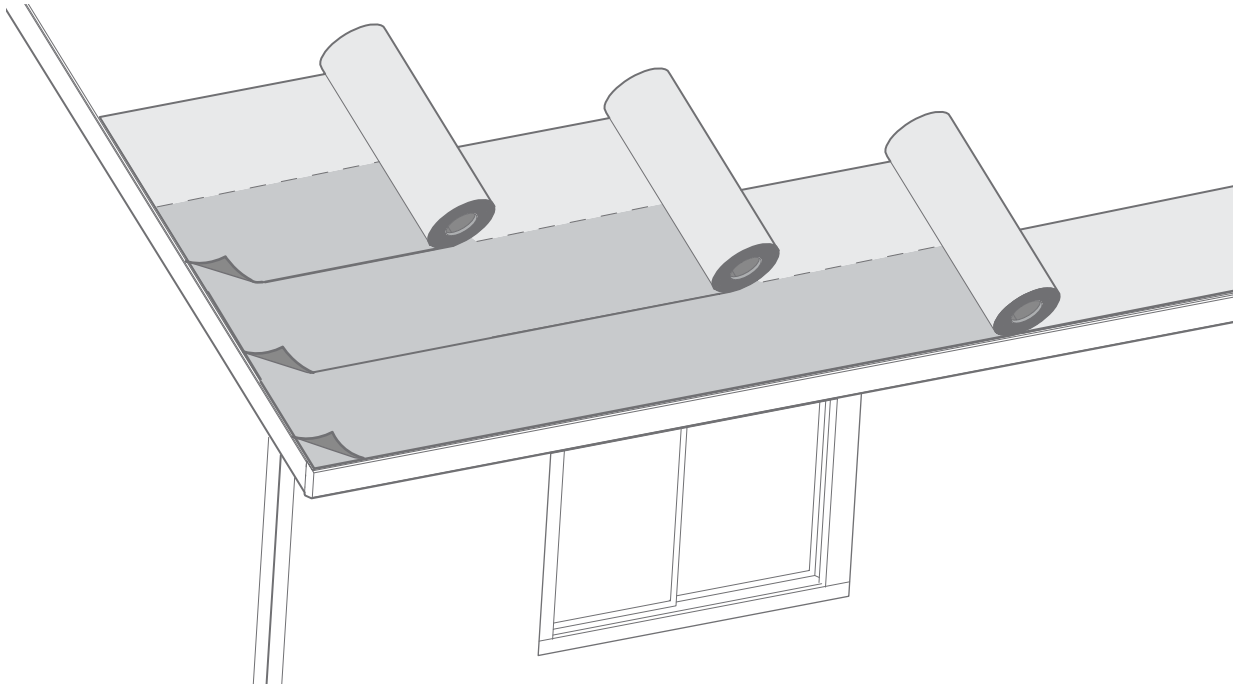
MATERIAL HANDLING

- Do not handle PV Modules under wet conditions unless wearing appropriate protective equipment.
- Do not attempt to make an electrical connection with wet, soiled, or otherwise faulty connectors.
- Do not wear metallic rings, watchbands, earrings, nose rings, lip rings, or other metallic objects while installing or troubleshooting PV systems.
- Do not use a PV Module with broken glass. A damaged PV Module cannot be repaired and must not be used.
- Do not open electrical connections or unplug connectors while the circuit is under load.
- materials are located.
- Do not apply paint or adhesive to any module top surface or backsheet.
- Do not drop PV Modules or allow objects to fall on modules. Do not leave a module unsupported or unsecured.
- Do not disassemble or modify PV Modules in any way. Doing so may degrade performance or cause irreparable damage and will void any applicable warranties.
- Do not allow children or unauthorized persons near the installation site or storage site of modules.
- Wear non-slip gloves when carrying PV Modules. Exercise caution when transporting and installing PV Modules.
- Do not lift any module by the module's junction box or electrical leads.

UNDERLAYMENT AND DECK LEVEL FLASHING

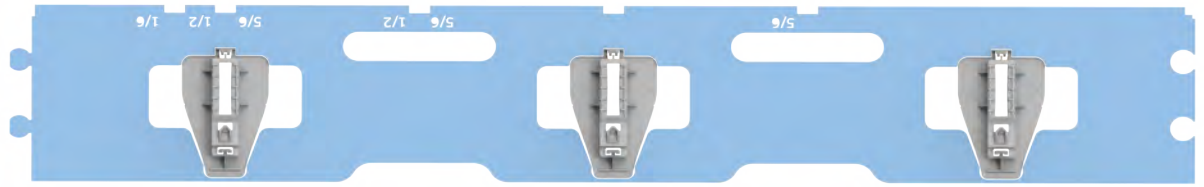
FIRESTONE CLAD-GARD

Firestone Clad-Gard is a self-adhering underlayment. Refer to the manufacturer's instructions for full details. Start with a half-width strip at the edge of the eave. Lap a full-width strip 18" to create a double



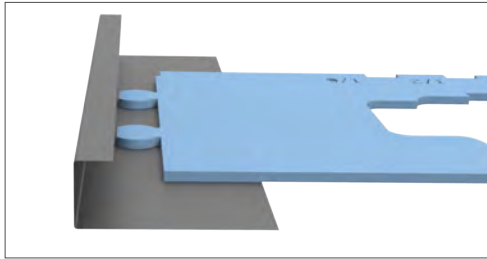
Standard Installation

STARTER COURSE | FULL TILE

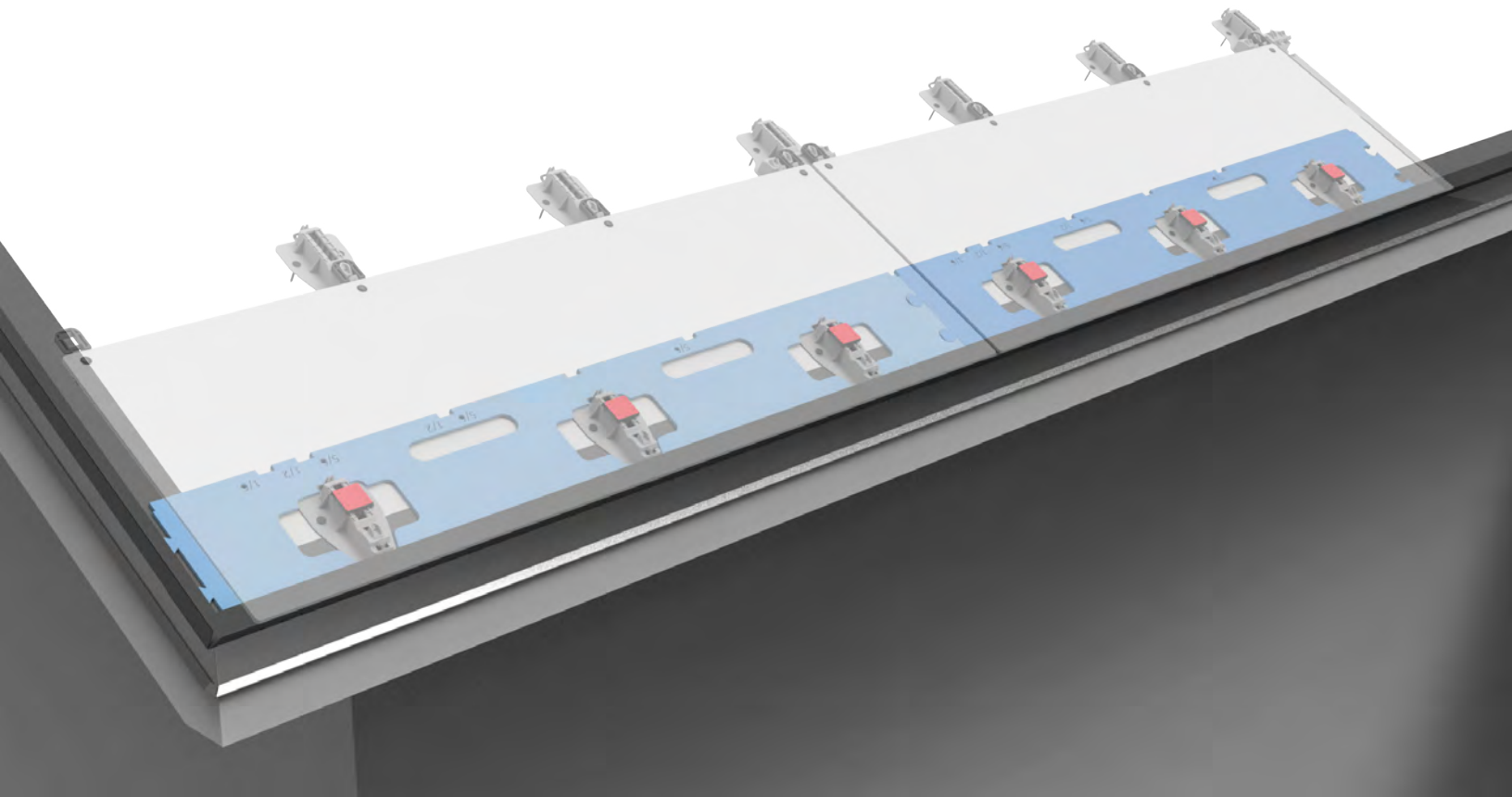


Starter Trim is free of any debris that would push up the jig from its correct position.

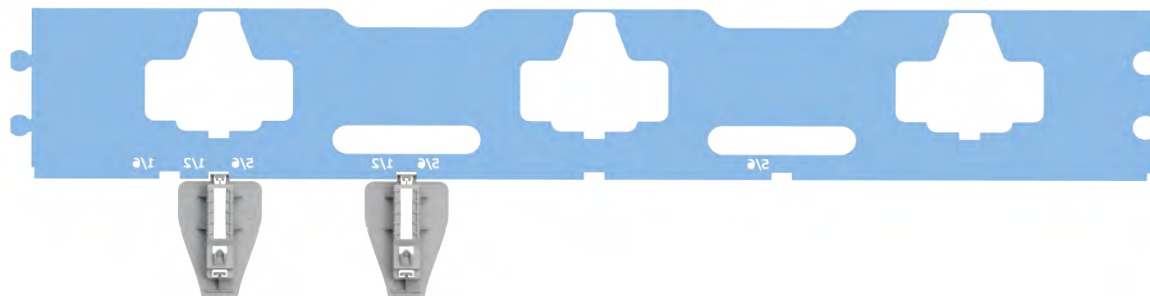
1. Abut the jig to the inside corner of the Starter Trim.
2. Align with the top edge of the Deck C-Channel to give the tile a 1" spacing the rake edge.



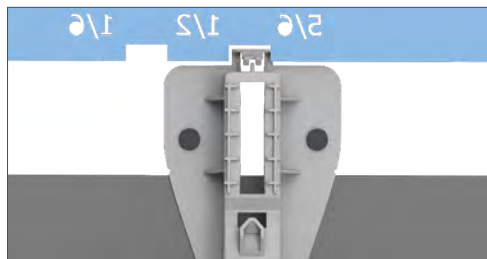
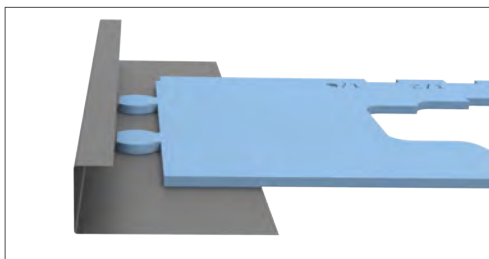
- 3.
- 4.



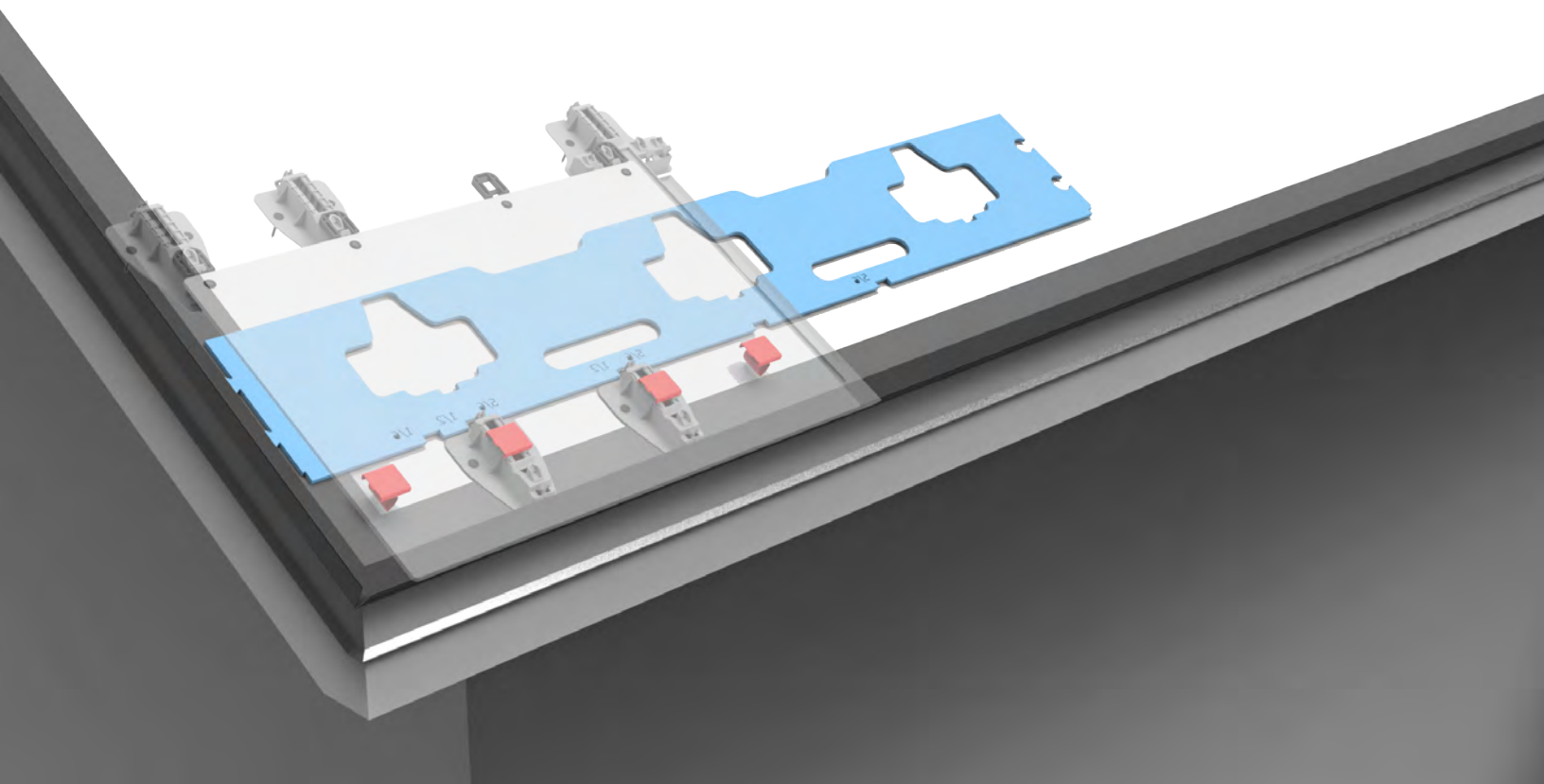
STARTER COURSE | PARTIAL TILE



1. Align the feet to the edge of the Starter Trim using the notches in the foot.
2. Align with the top edge of the Deck C Channel to give the tile a 1" spacing the rake edge.



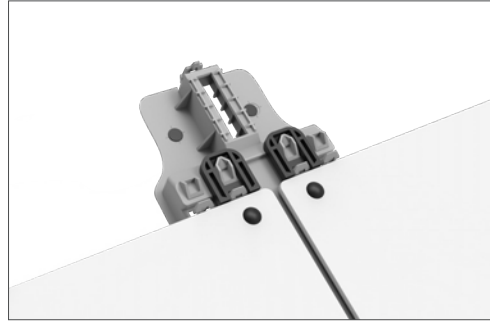
- 3.
- 4.



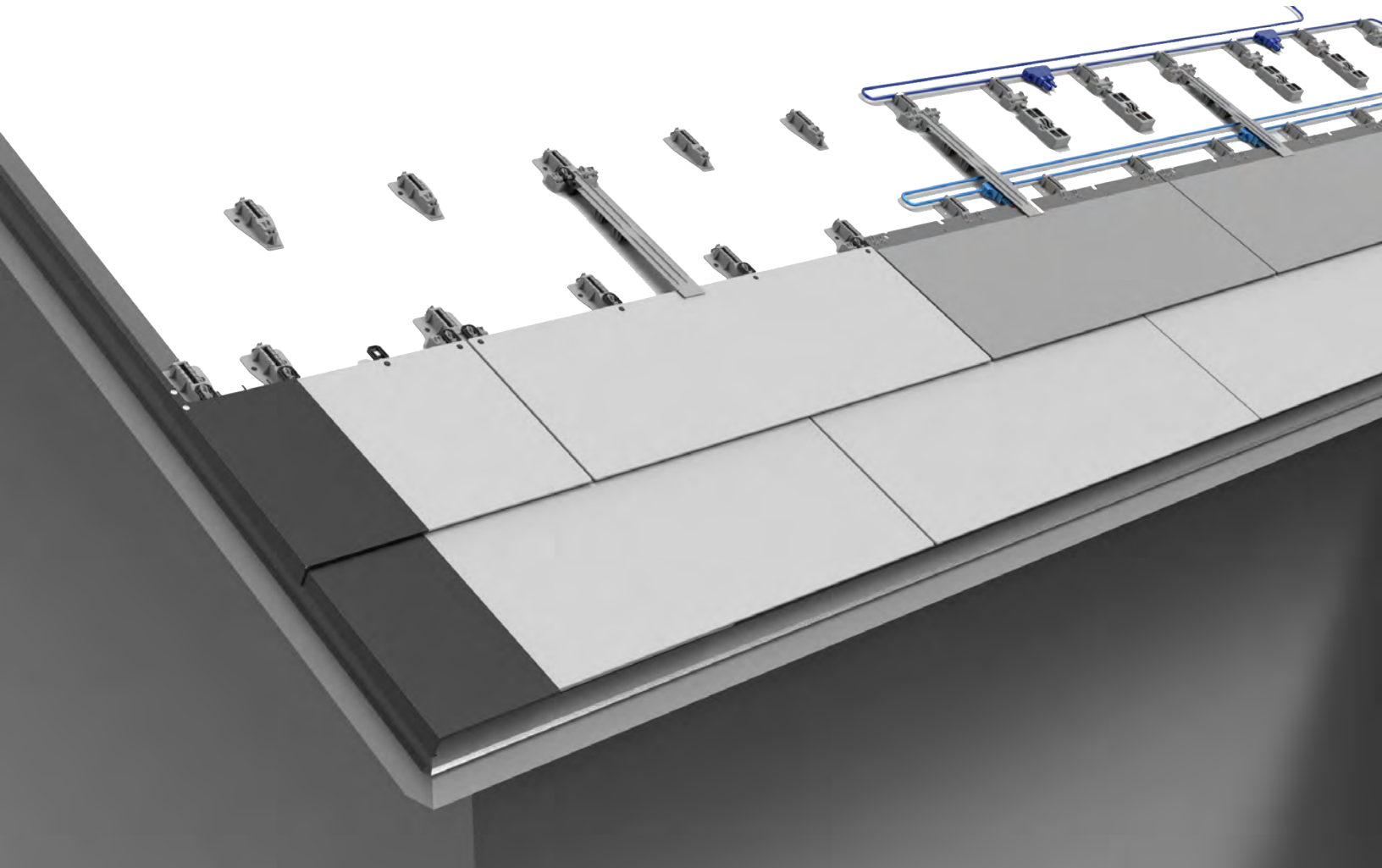
ARRAY LAYOUT & SECOND ROW

Tile and Partial Tile uproof row by row.

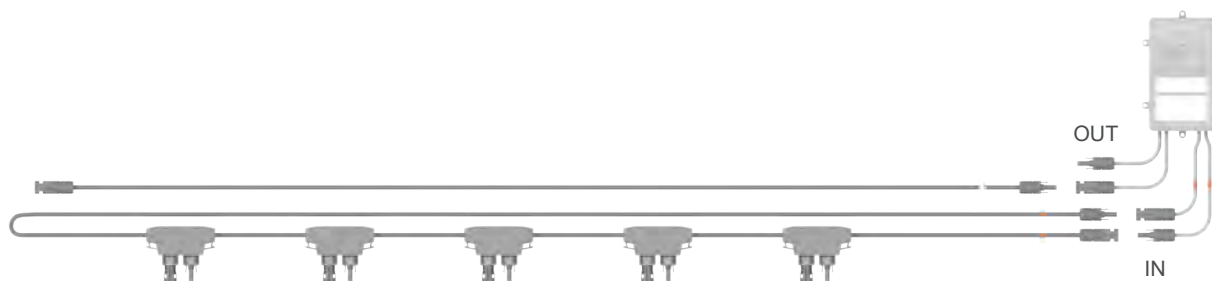
1. Position the row spacing (tile reveal) using the timing marks on the Footlap.
2. Tiles will share a Footlap.



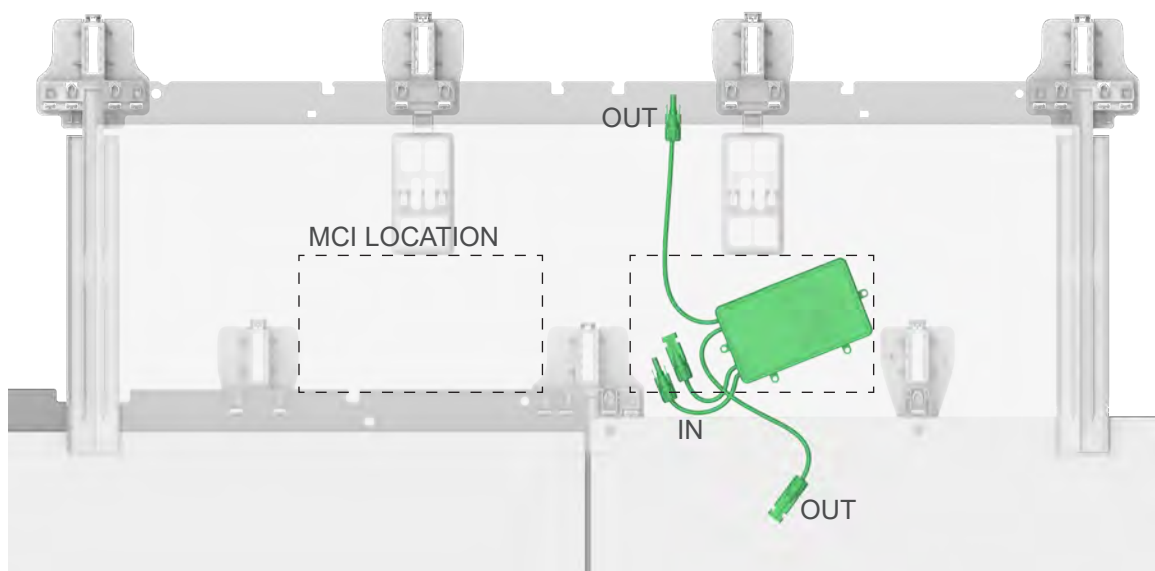
3. Engage the Uplift Clip(s) to a minimum of one foot downroof. Each tile needs to be anchored with at least three feet total.
4. Install the appropriate tile level flashings over the Roofing and Partial tiles at edge conditions.



MID-CIRCUIT INTERRUPTER



The Mid-Circuit Interrupter is installed directly above the row or sub-string of modules that connects to its input. Abide by all MCI Manufacturer instructions when installing the MCI. Fasten the MCI to the deck using standard fasteners. The input leads are shorter and connect to the positive and negative terminations of that Diode Harness sub-string. The output leads connect to the Diode Harness sub-strings above and below.



INSTALLATION BEST PRACTICES

- Position the MCI at a slight angle to assist with water shedding.
- Install the MCI between the module feet. The MCI cannot interfere with module supports.
- Do not install the MCI in a manner which would cause it to raise the PV Module above it. For example, directly underneath a Footlap.
- Provide enough clearance so the MCI does not directly contact the downroof module. The MCI cannot come in contact with the glass or backside of a module.
- For ease of installation, position the MCI to the right or left of the last PV Module.

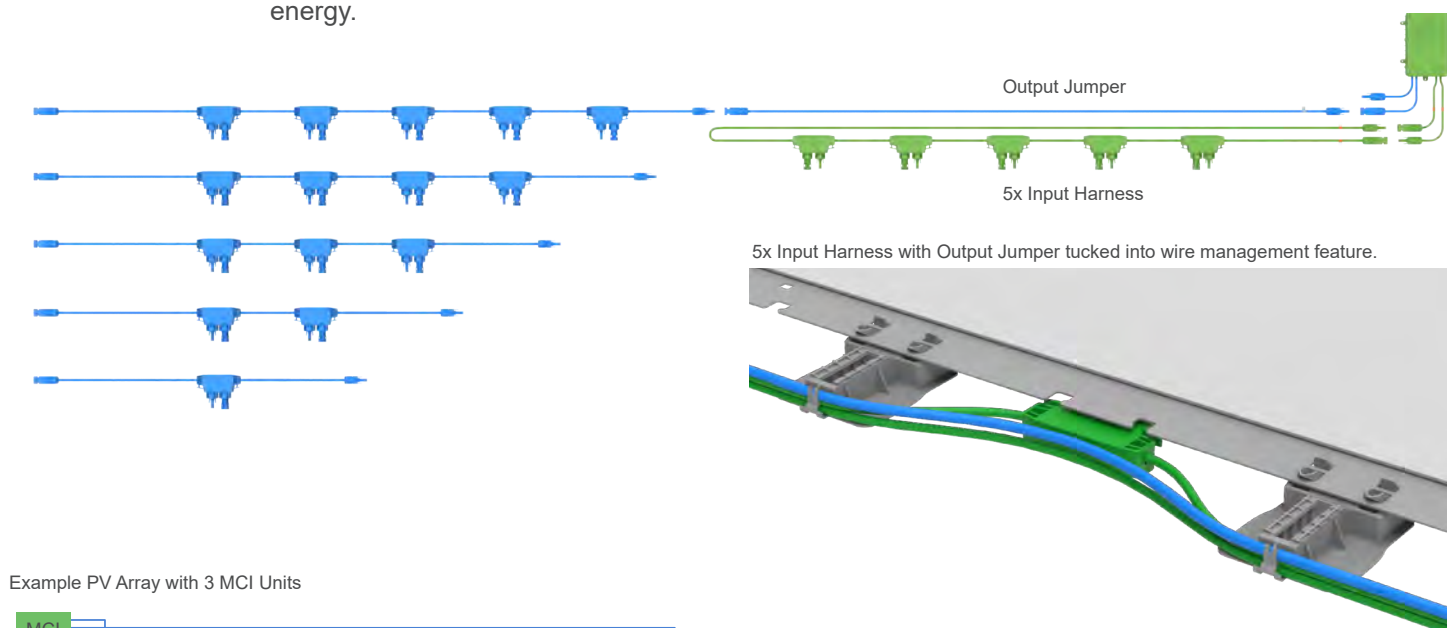
POWER FLOW DIAGRAM



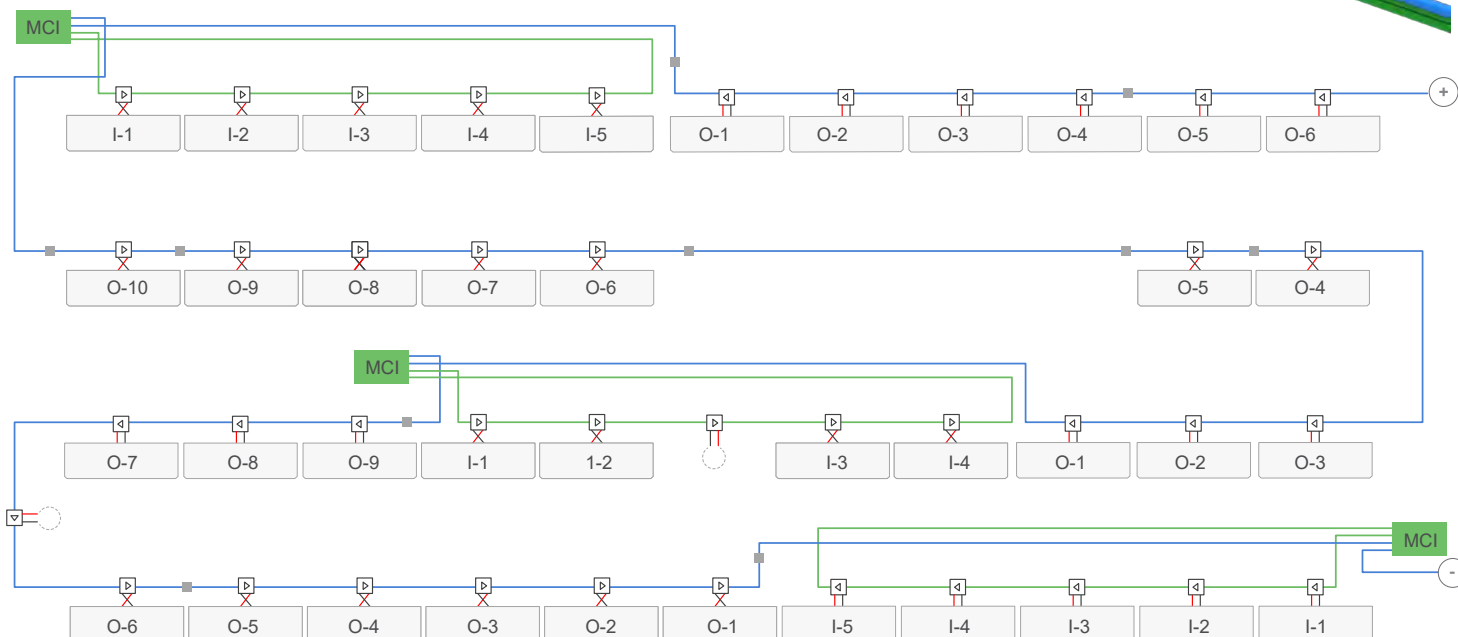
SERPENTINE WIRING SCHEMATIC

A serpentine wiring schematic weaves back and forth along the PV array. Connect the 5x Input Harness to the MCI input, then connect 10 or fewer Solar Roof PV Modules between MCI units.

- Do not swap input and output leads, this may overpower the MCI.
- Maximize the number of tiles per MCI (both input and output). To minimize hardware costs, avoid connecting MCI output directly to output of another MCI where feasible.
- An MCI must be connected to one end of a series string or sub-array string. It is not required on important.
- Use the wire management features on the module feet to hold up to 3 conductors. Tuck the Diode under the module.
- For areas with skipped PV Modules, such as at obstructions, install a Mini Jumper at the diode to close the circuit. Failing to do so will result in an open circuit and the entire string will not yield any energy.



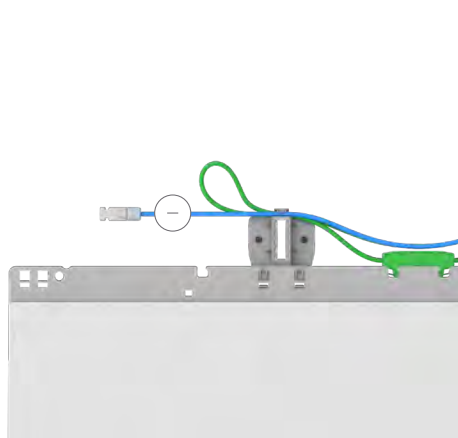
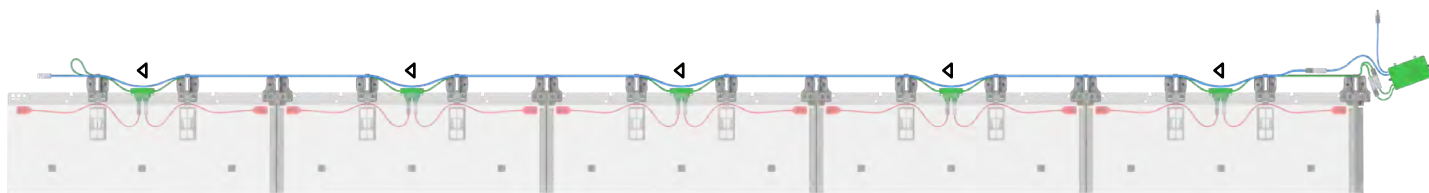
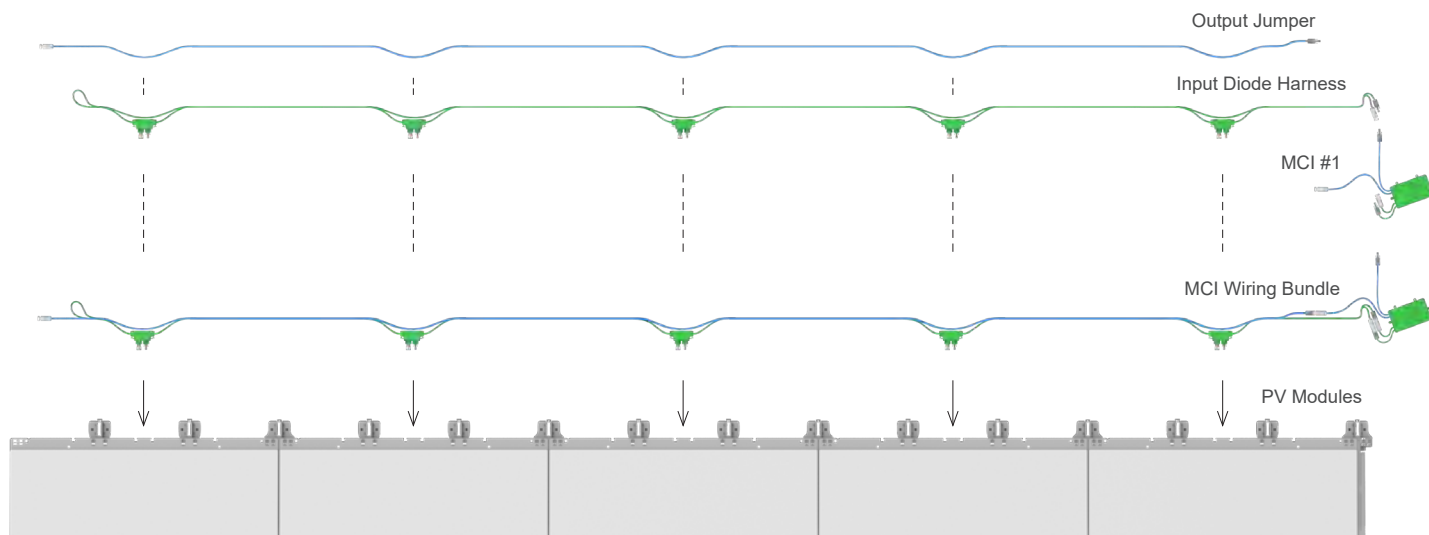
Example PV Array with 3 MCI Units



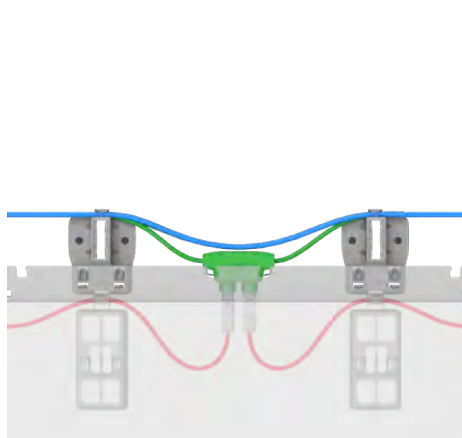
42 SERPENTINE WIRING SCHEMATIC

MCI INPUT ASSEMBLY

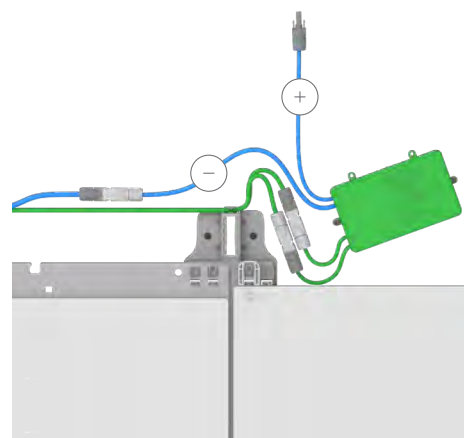
Connect 3 to 5 Solar Roof PV Modules to the MCI input (80V max). These modules will power the MCI. The wiring bundle contains the positive and negative input leads and a jumper to connect to the next (output) diode harness.



The input wire will wrap back to the MCI while the output wire extends to the next (output) 10x diode harness.



Plug the PV Module into the Diode and tuck the Diode under the PV Module.

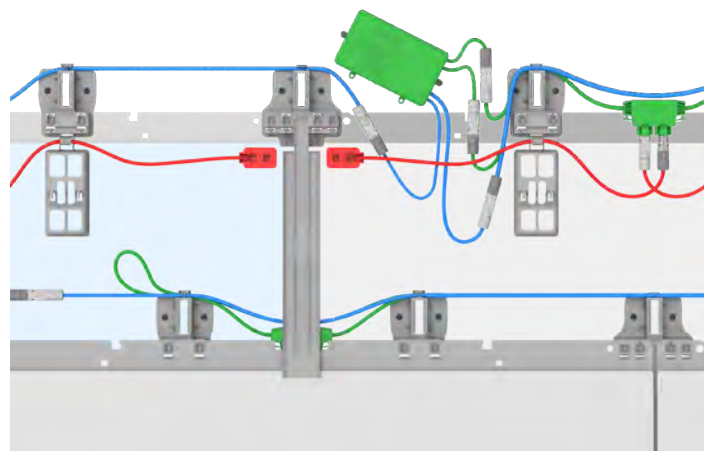
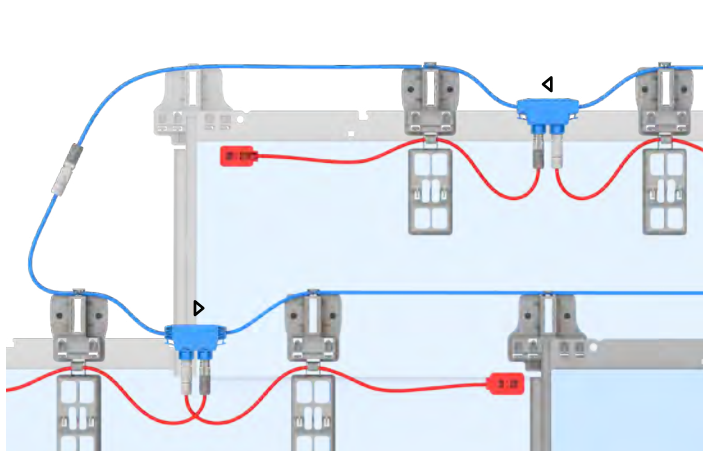
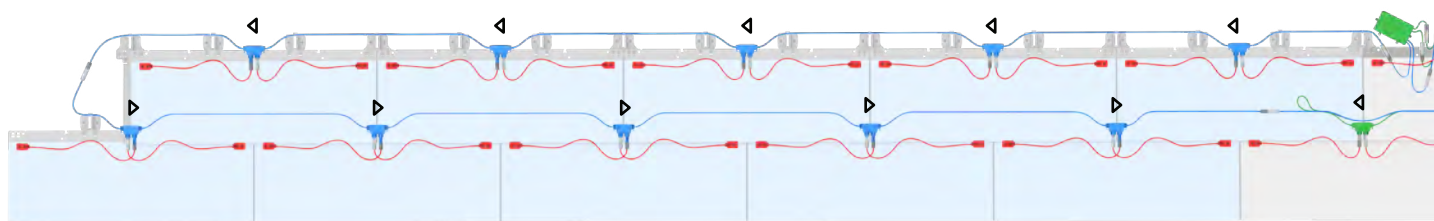
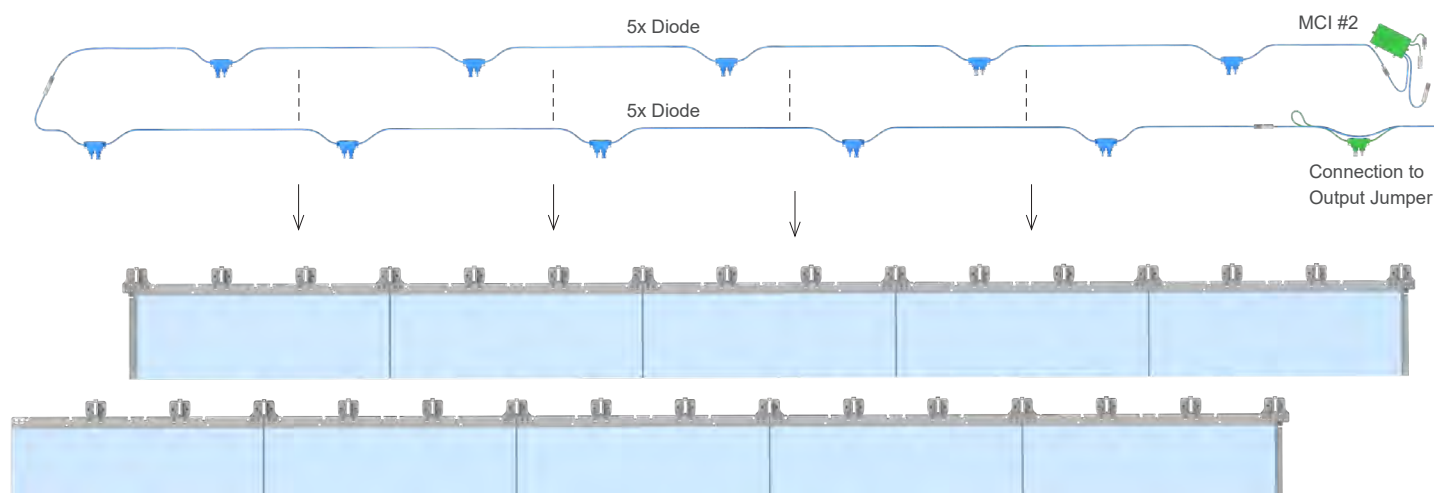


If not pre-assembled, connect the positive (female) and negative (male) input leads into the MCI. Connect the negative (female) output lead to the MCI.

SERPENTINE WIRING SCHEMATIC

MCI OUTPUT ASSEMBLY

Connect 10 or fewer Solar Roof PV Modules between MCIs.



The output wire will wrap up to the next row. The module leads on the subsequent row will be reversed to connect to the Diode.

If not pre-assembled, connect the positive (female) and negative (male) input leads into the MCI. Connect the negative (female) output lead to the MCI.

STRING TESTING PROCEDURE

all modules are connected properly and also that all modules are producing as designed. This testing is critical as any diagnostics and/or remediation of underperforming or miss-installed systems is challenging and time consuming.

- The data tested/collected is the Open Circuit Voltage (Voc) of the PV Modules when installed in series.
- When installed in series the Voc of these modules measure in a cumulative function.
- This number is representative of the nominal Voltage of the modules (13.34) multiplied by the number of modules.
- During the course of the installation ambient conditions may change depending on temperature and cloud cover being the biggest factors. Take a test reading from one PV module at beginning of population, after a break, or any big change in sunlight.

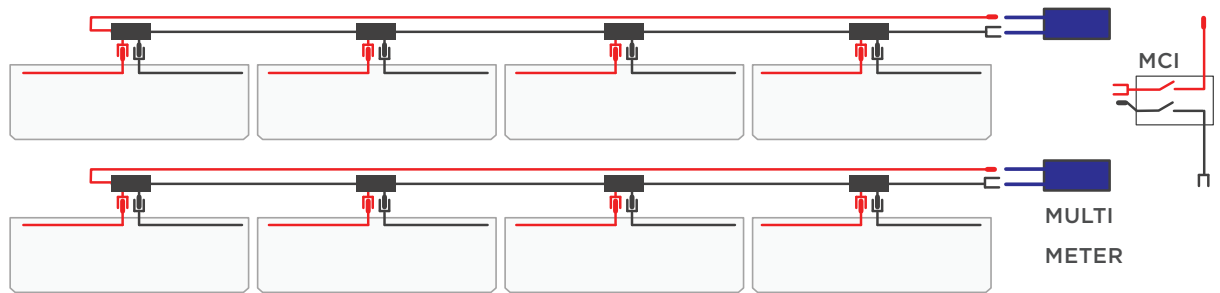
T platform (JCO) to ensure this information is available through the lifetime of the system. Additionally stringing as designed matches the string as installed are a requirements.

1. Voc is checked by plugging in to both ends of the circuit. *Note: This may be challenging due to split arrays.* Test each 10 x and MCI 5 x rows as you go. Typically, this happens at each completed diode section from the homerun or bypass section.
2. Verify that the Voc has jumped by the correct amount (# Modules x ~Voc).
Voc should increase to the relative control value multiplied by the number of modules in the row.
3. Record values on Voc sheet for each string. W
inconsistencies or issues that might arise with the diodes or wiring.
4. oc for the string.
This information is required as part of the job close out portion.

VOC TESTING

CURRENT PROCESS - NO MCI BYPASS UNIT

If no Bypass Unit is available the course by course testing is conducted just after the diodes are plugged into the modules, but BEFORE they are connected to the rest of the string. Utilize a multi-meter to determine output and record on the Voc Checklist. Extra care needs to be taken to ensure that connections made to the surrounding Diode Trunks are correct. This method generates a Voc count ONLY for the tiles in that subsection. This could read across multiples courses of PV tiles.

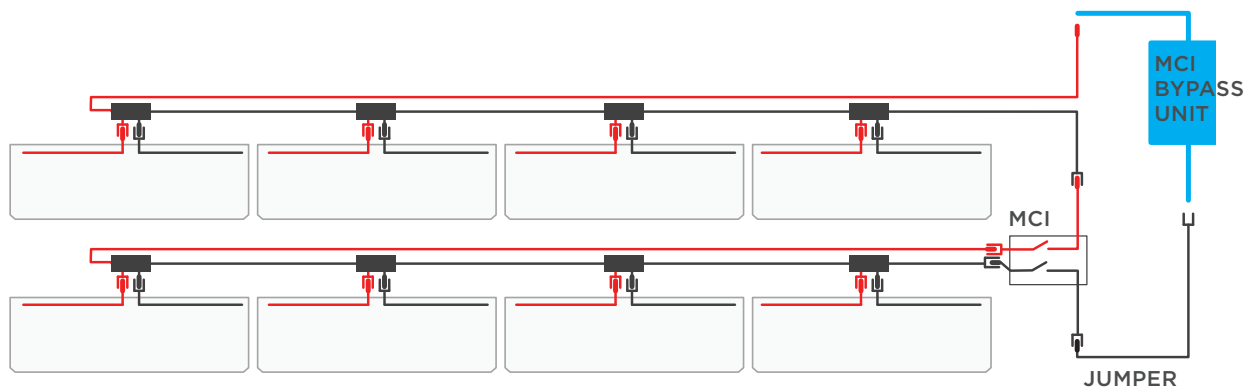


CURRENT PROCESS - MCI BYPASS UNIT

of string level Voc . The MCI Bypass Unit solves this issue by sending enough power to the MCIs to

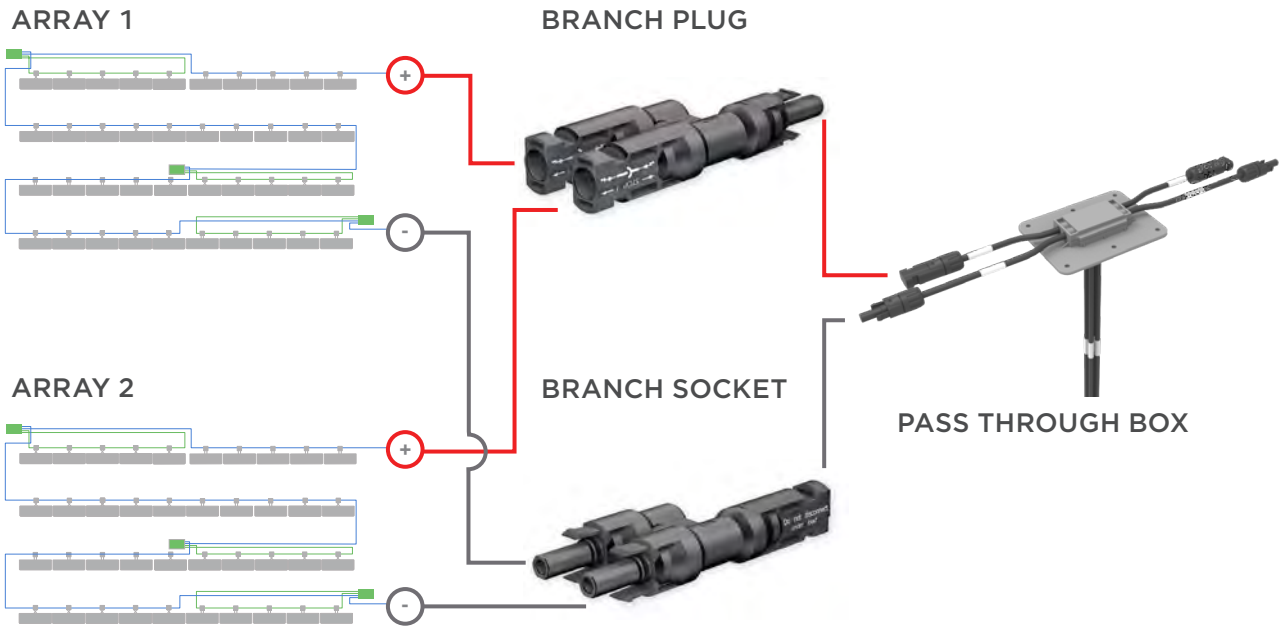
As the array is installed ensure that the low end jumper remains exposed and travels up the mounting plane along with the installation, this jumper will be used as one end of the circuit and will need to plug in to the MCI Bypass Unit.

Complete the circuit by connecting to the modules below and the bypass unit. As long as the unit power source is charged the string will now be powered. Utilize a multi-meter to determine output and record on the Voc Checklist. Also, ensure that the diodes have either a PV module or bypass jumper in them before testing a completed row.



BRANCH SOCKET AND PLUG

Branch Sockets and Branch Plugs are used to make parallel connections between PV strings before entering a Pass Through Box.



PASS THROUGH BOX

Verify transition location on plan set. Install Pass Through Box using wiring methods and materials that comply with Article 690 and Chapter 3 of the NEC and local regulations.



Disengage Uplift Clips in the tile by gently prying the tile up using a door lifter (tile removal tool). Push the tile uproof to disengage the uproof hooks from the feet, then slide the tile downroof and out of the array.

